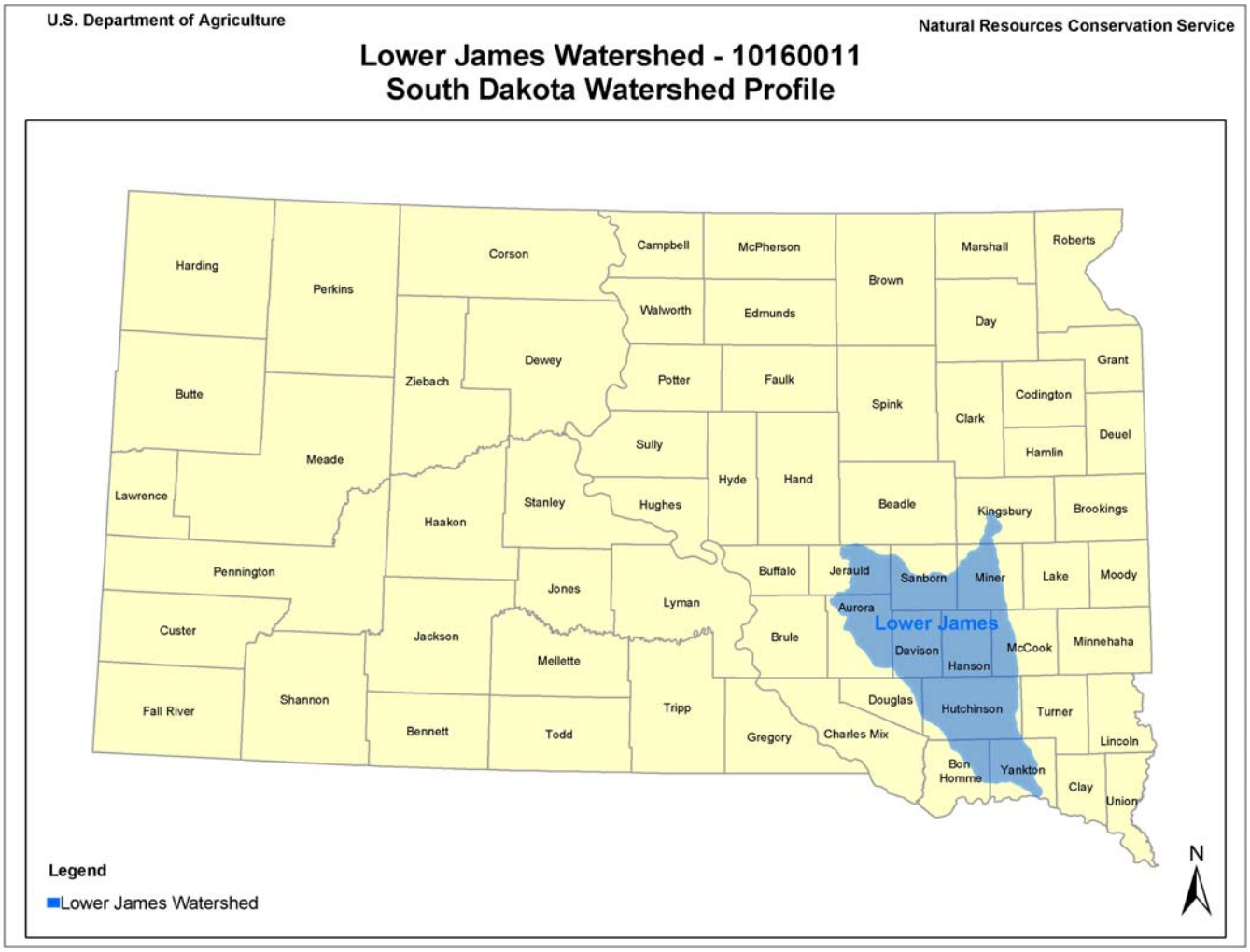
South Dakota

LOWER JAMES - 10160011
8-DIGIT HYDROLOGIC UNIT PROFILE

USDA Natural Resources Conservation Service **July 2009**

SOUTH DAKOTA
Rapid Watershed Assessment



JULY 2009

Produced by:
United States Department of Agriculture
Natural Resources Conservation Service
200 Fourth Street SW
Huron, South Dakota 57350

South Dakota

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USDA Natural Resources Conservation Service **July 2009**

Lower James Watershed
South Dakota (SD)

Rapid Watershed Assessment Project

Sponsored by:

SD Association of Conservation Districts

SD Department of Environment and Natural Resources

SD Department of Agriculture

SD Department of Game, Fish, and Parks

Aurora Conservation Districts

Bon Homme Conservation Districts

Davidson Conservation Districts

Douglas Conservation Districts

Hanson Conservation Districts

Hutchinson Conservation Districts

Jerauld Conservation District

Kingsbury Conservation Districts

McCook Conservation Districts

Miner Conservation Districts

Sanborn Conservation Districts

Yankton Conservation Districts

South Dakota

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USDA Natural Resources Conservation Service **July 2009**

Executive Summary

A Rapid Watershed Assessment (RWA) document compiles existing resource information and data within a watershed and is used to assist conservation districts (CDs), landowners, and other community organizations and stakeholders to identify where conservation investments are best utilized and set resource conservation goals. The RWA contains summaries of resource concerns and opportunities that are useful for a number of resource conservation activities. Local landowners and organizations can use the RWA as a basis to prioritize resource concerns and estimate the technical and financial resources required to achieve their resource conservation goals within the watershed. The assessment provides information that can be used to develop conservation district annual and long-range plans, or establish a foundation for more detailed watershed, area wide, or site-specific natural resource planning and the development of implementation plans.

A RWA provides sufficient information to help facilitate making some key resource management decisions. The RWA:

- Provides a quick and inexpensive source of information on which to base decisions about conservation priorities, allocation of resources, funding for implementation, and how to report outcomes/results.
- Supplies enough detail to identify conservation activities that can be implemented without waiting on further watershed-level studies or analyses.
- Provides a preliminary source of information for standard environmental evaluations.
- Identifies if there is a need for further detailed analysis or watershed studies.
- Determines if there are infrastructure needs.
- Addresses multiple concerns and objectives of landowners and communities.
- Enhances established local, state, and federal partnerships.
- Enables landowners and communities to decide on the best mix of Natural Resources Conservation Service (NRCS) programs and other funding sources to meet their resource concerns/needs.
- Evaluates availability of conservation program tools (cost-share, easements, and technical assistance).

The RWAs consist of two parts: the watershed profile which provides the physical, biological, and sociological characterization of the watershed resources; and the watershed assessment which defines the identified resource concerns and evaluates the effectiveness, the extent, and the associated costs of the conservation practices that address the identified resource concerns.

The RWAs are developed based on the first six steps of the NRCS conservation resource planning process on a watershed scale. The information is general in nature and is not sufficiently detailed to be used in lieu of an area wide or watershed plan when the identified resource concerns require specific information, for example, flood prevention or control. However, the information does provide a solid starting point for local stakeholders to use should they decide to proceed with a more detailed area wide or watershed planning effort or the development of a watershed implementation plan using existing NRCS conservation programs.

South Dakota

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8-DIGIT HYDROLOGIC UNIT PROFILE

USDA Natural Resources Conservation Service (NRCS) **July 2009**

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8-DIGIT HYDROLOGIC UNIT PROFILE

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I. WATERSHED PROFILE

1.0 PURPOSE

The watershed resource profile compiles the most recent, readily-available data which provides a physical, biological, and sociological characterization of watershed resources. The profile inventories the current resource health and condition of the soil, water, plants, animals, and social resources of a watershed and identifies the known resource concerns. The watershed profile also provides a brief overview of the social and economic composition of the watershed.

The profile summary of the resource conditions, concerns, and opportunities is useful for a number of conservation activities. Local landowners and organizations can use the information to prioritize resource concerns and estimate the technical and financial resources required to achieve resource conservation goals within the watershed. The information can be used to develop conservation district annual and long-range plans, establish a foundation for a more detailed watershed, area wide, or site-specific natural resource plan, or the development of an implementation plan.

2.0 INTRODUCTION

The Lower James Watershed 8-Digit Hydrologic Unit Code (HUC) subbasin is 2,258,800 acres located in 12 counties of southeastern SD. The watershed counties include Aurora, Bon Homme, Davidson, Douglas, Hanson, Hutchinson, Jerauld, Kingsbury, McCook, Miner, Sanborn, and Yankton.

Unique to the watershed is that a portion of the Yankton Sioux Tribe tribal lands are located in the watershed. The dominant land use is cultivated cropland, approximately 1,307,000 acres or 58 percent of the watershed. Corn, small grains, soybeans, and sunflowers are the primary crops grown. Alfalfa and grass hay are also produced and included in some crop rotations. Rangeland and pastureland account for 671,700 acres or 30 percent of the watershed. Beef cattle production is the primary use on pasture and rangeland. Growing cash crops and hay, raising beef cattle, and dairying are the main agricultural enterprises. Agricultural production is a vital part of the local economic base.

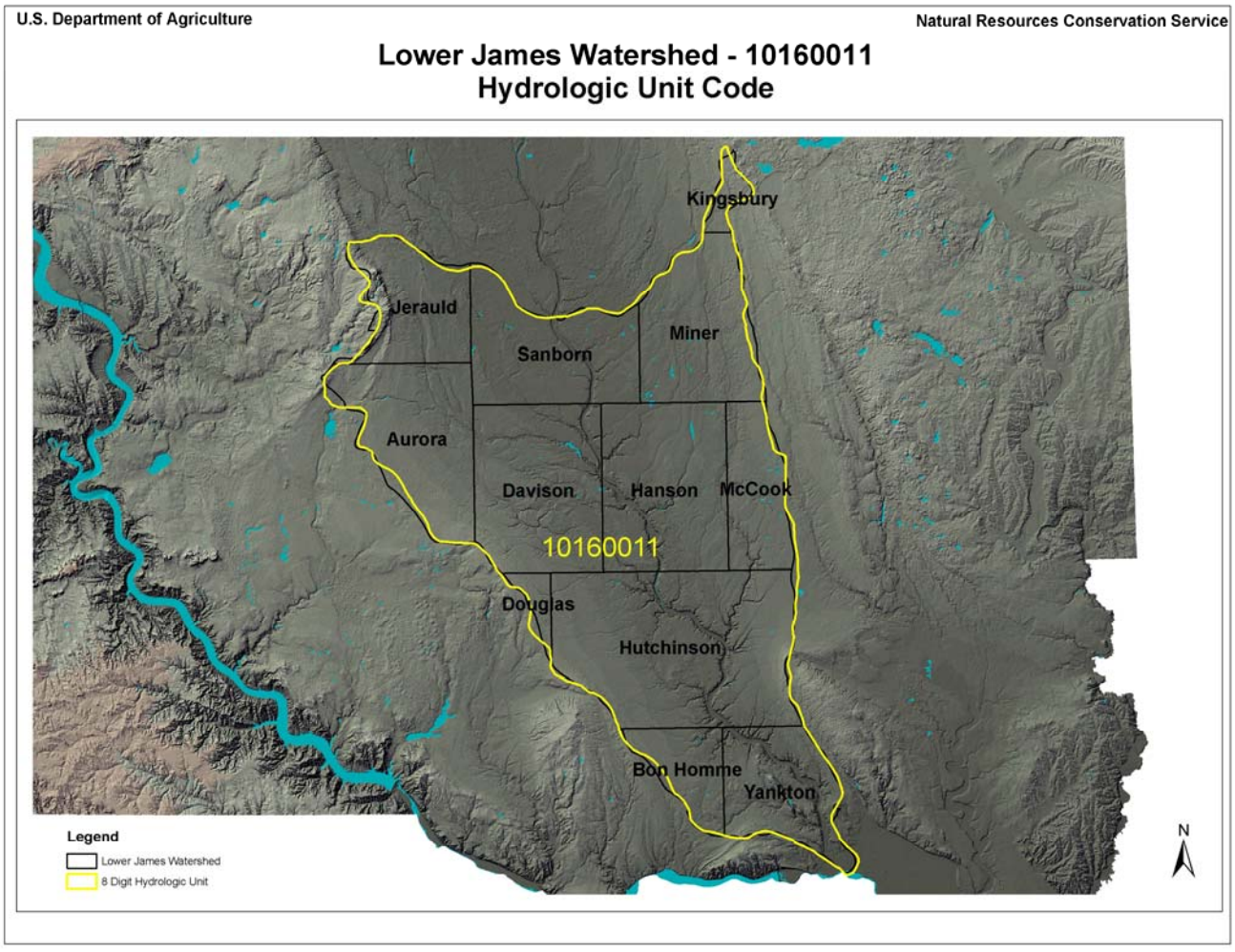
Conservation assistance is provided by 12 NRCS service centers, 2 field support offices, and 12 CDs.

3.0 PHYSICAL DESCRIPTION

The physical description of the Lower James subbasin provides a general description of the watershed location, geology, topography, precipitation, and climatic ranges.

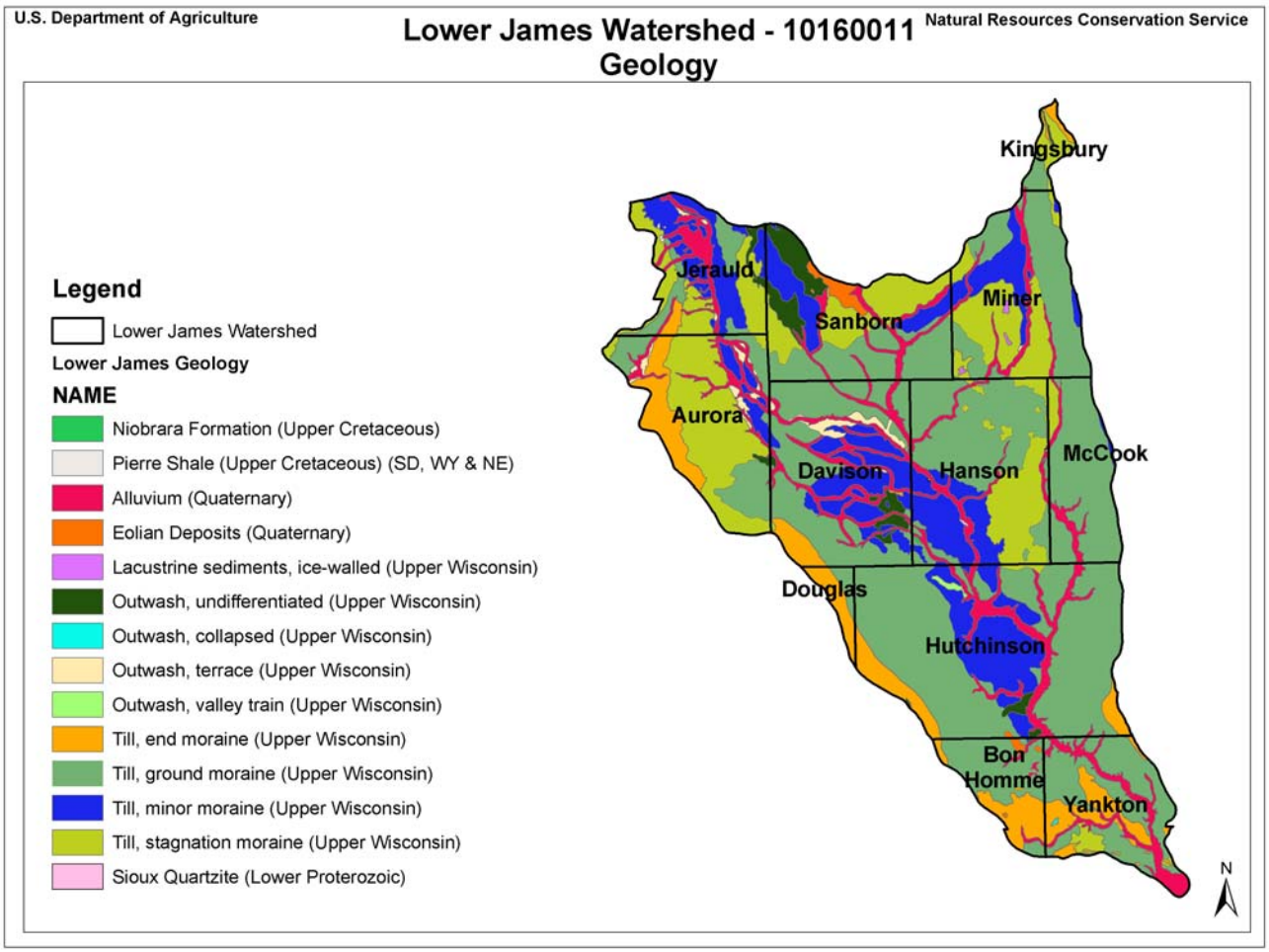
3.1 HYDROLOGIC UNIT CODE (HUC)[1]

A HU is part of a multi-level watershed mapping classification system. The HU boundaries are defined by hydrographic and topographic criteria used to delineate areas of land that contribute surface water runoff to a designated outlet point, such as a lake or stream segment. The United States Geological Survey (USGS) designates HU drainage areas as subwatersheds (including smaller drainages) numbered with 12-digit HUCs, nested within watersheds (10-digit HUCs). Watersheds are combined into larger drainage areas called subbasins (8 digits), basins (6 digits), and subregions (4 digits), which make up the large regional drainage basins (2 digits).



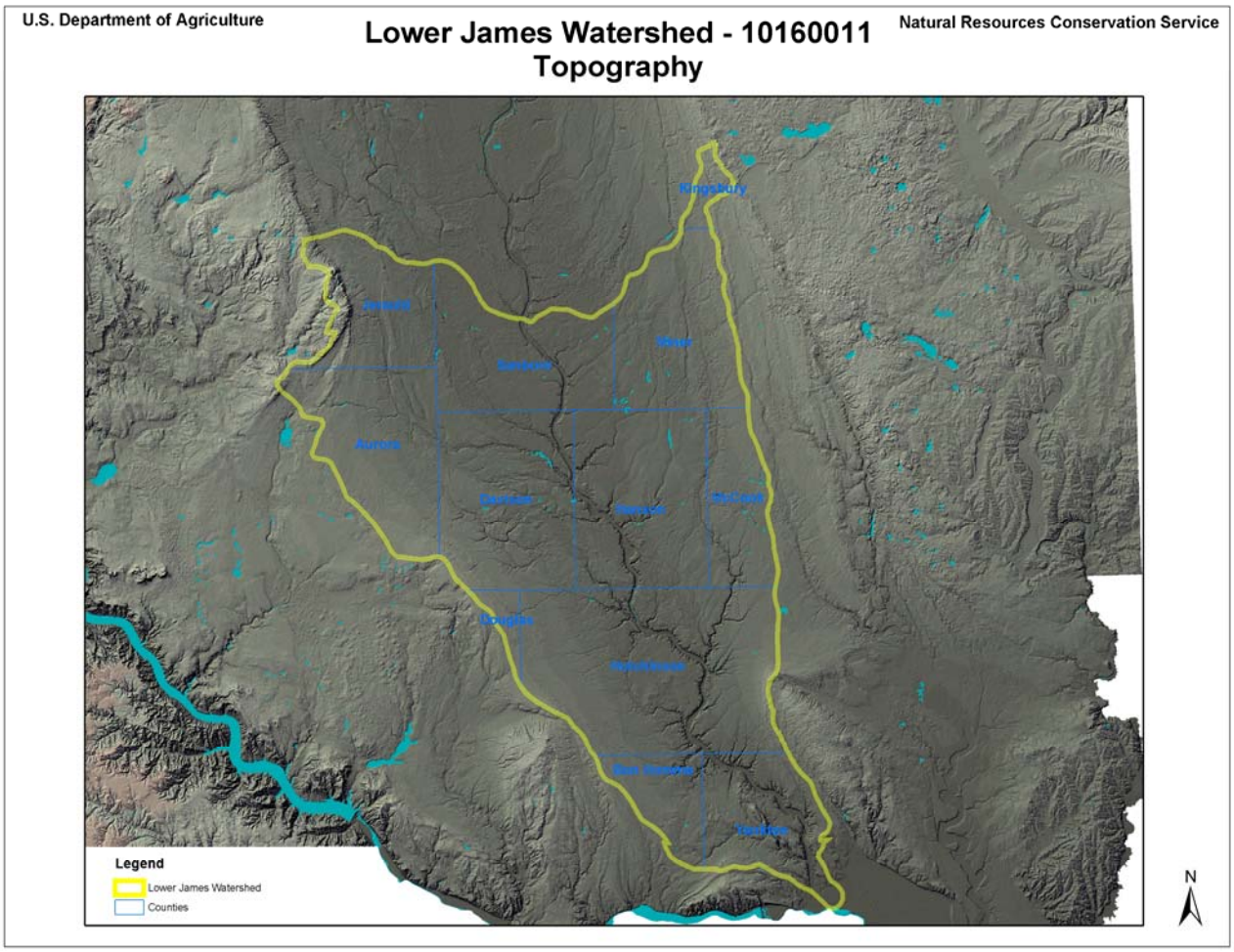
3.2 GEOLOGY[2]

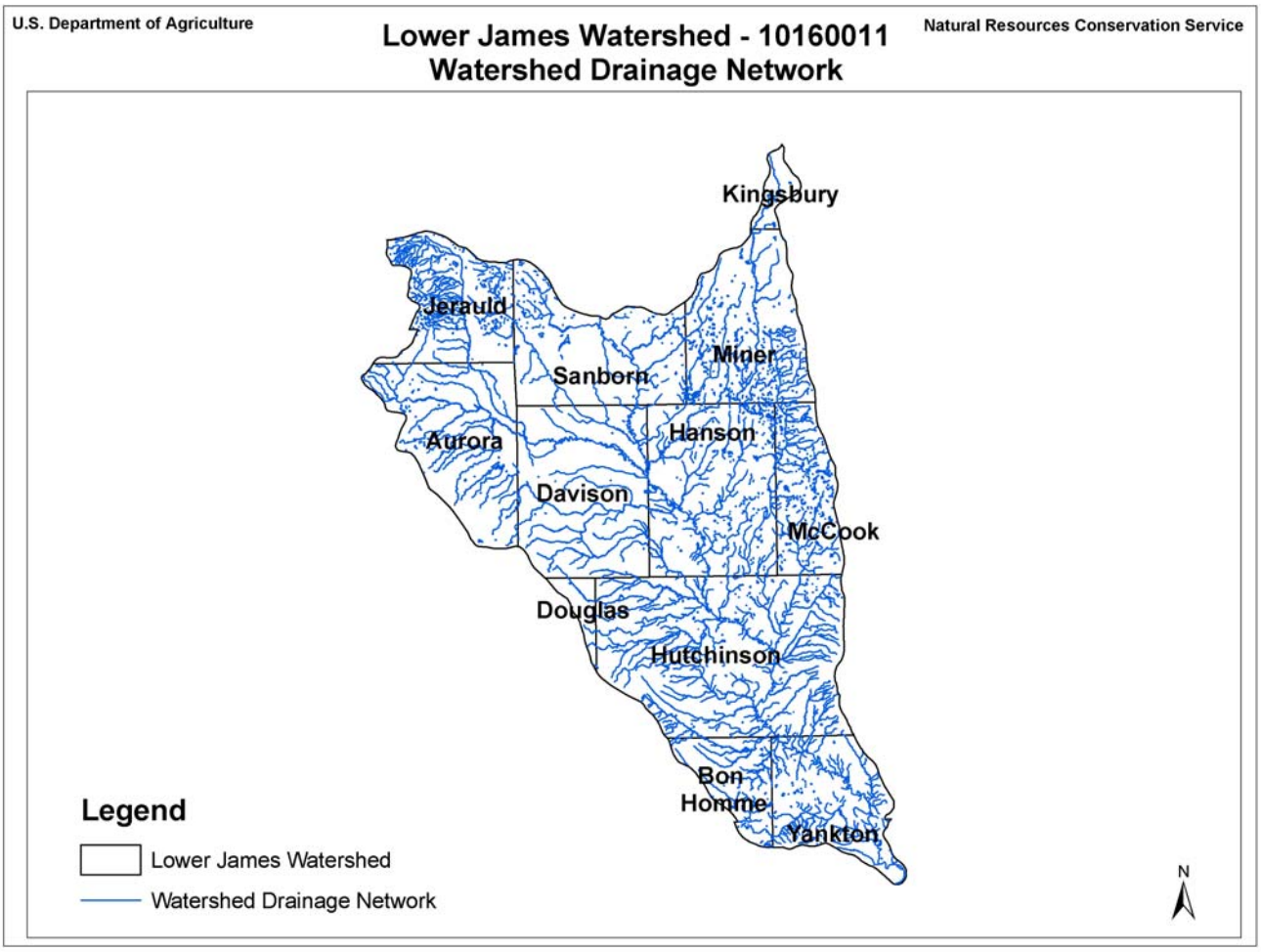
Precambrian metamorphic and igneous rock formations of granite, gneiss, limestone, sandstone, and shale underlie the entire watershed. Late Cretaceous sedimentary rocks of marine origin directly overlie the Precambrian bedrock. The surface geology of the watershed was formed by a series of Pleistocene glacial events. Glacial drift, the debris deposited by moving ice and glacial streams, determined the geologic features of the watershed. A sequence of glacial sediments (glacial till) was deposited directly from the ice as the glaciers advanced and retreated. The glacial till is generally an unconsolidated heterogeneous mixture of clay, silt, sand, gravel, and boulders ranging widely in size and shape. Thin sand and gravel layers occur erratically within and between the till layers. Glacial melt water streams formed localized, stratified deposits of well sorted clays, sands, and gravels (glacial outwash) as the glaciers receded. The glacial till commonly ranges between 100 and 300 feet thick, but may be in excess of 1,000 feet thick in some areas of the watershed. The upper 20 to 150 feet of the glacial till has been altered by weathering to gray smectitic clays.



3.3 TOPOGRAPHY[1]

The watershed is located in the Central Lowlands Physiographic Province and lies within the James River lowland physical division. The James River and its tributaries are the principal drainage system of the watershed. The relief of the watershed varies from level to undulating, or gently rolling.





3.4 CLIMATE

The climate of the Lower James Watershed is semi-humid and continental, characterized by large seasonal fluctuations in temperature, long winters, warm summers with moderate to high relative humidity, and frequent high winds. Storms are generally of moderate intensity and short duration; localized convective, high intensity storms of short duration are common. Recurring periods of drought and near-drought conditions are common. Less frequently periods of short duration yield higher than normal amounts of precipitation. Warm to hot summer months give way to cold winters. On the average, between 70 and 80 percent of the annual precipitation occurs from April through September, the growing season for most of the crops raised in the area, with the largest amount generally occurring in June. The average growing season ranges from 115 days to 130 days with the last killing frost in mid-May and the first killing frost in mid-September. Many freeze-thaw events occur in the fall and early spring.

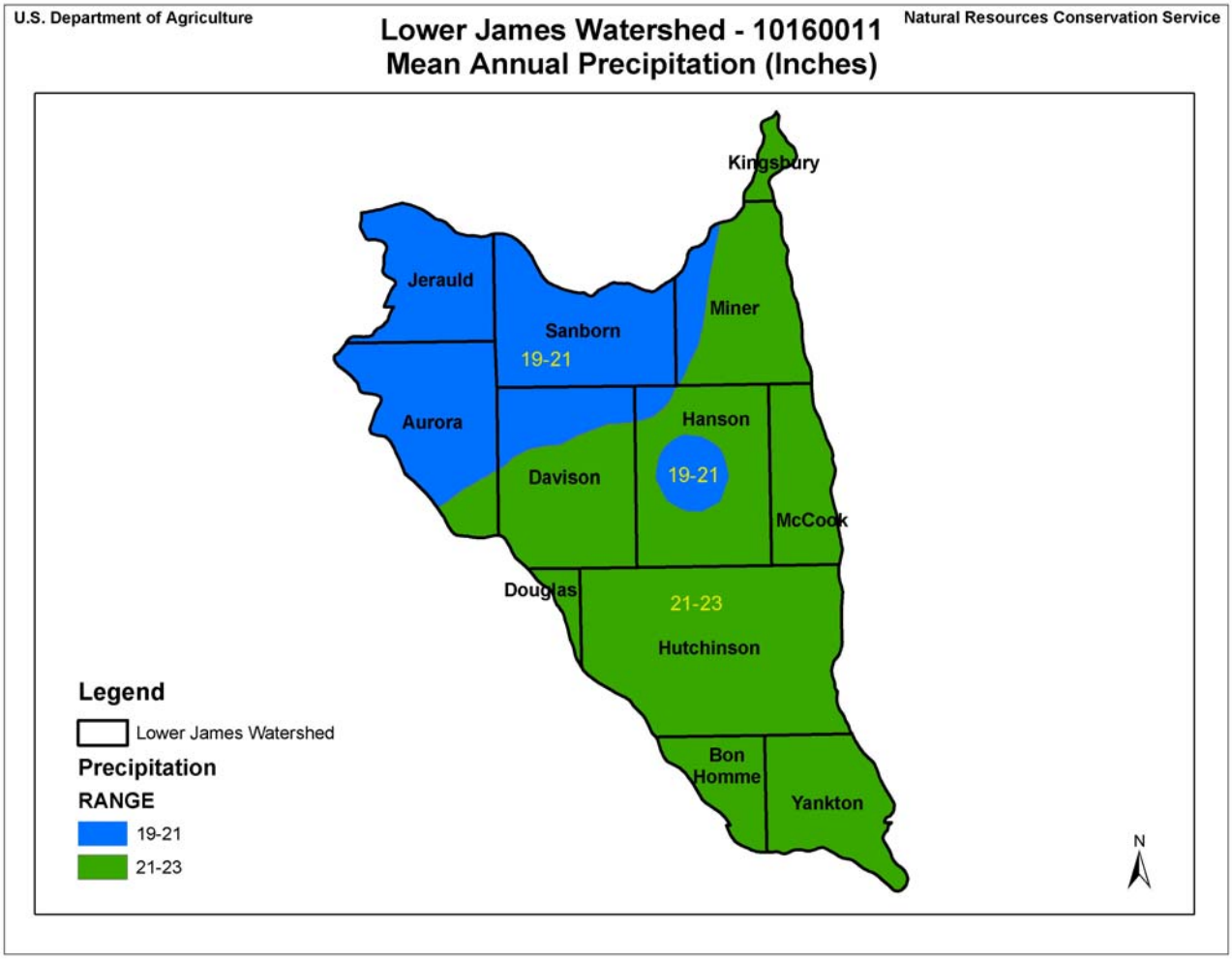
It is estimated that more than 75 percent of the annual runoff occurs during the four-month period of March through June. The high runoff in March and April is usually from snowmelt while the runoff in May and June is from rainfall. Heavy runoff during the summer months is caused by brief, intense thunderstorms. Annual runoff can vary widely from year to year; the average annual runoff totals 1.25

inches. Most of the tributaries will show periods of low or no flow almost every year during the fall and winter months.

The historical data records for average temperature, wind speed, and relative humidity data used to represent the watershed are from the Mitchell municipal airport, the county seat of Davison County, SD, which is centrally located in the watershed.

3.4.1 Precipitation[3]

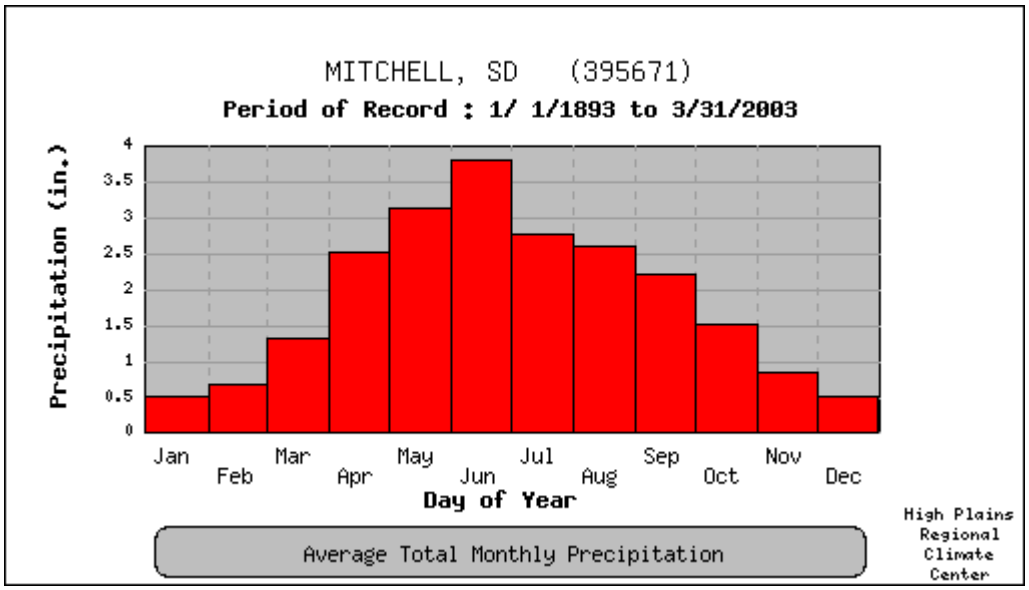
The average annual precipitation for the watershed area is 22.7 inches per year measured at the U.S. Weather Bureau Station at Mitchell, SD.



3.4.1a Precipitation Distribution Graph

MITCHELL, SD

POR - Monthly Average Total Precipitation



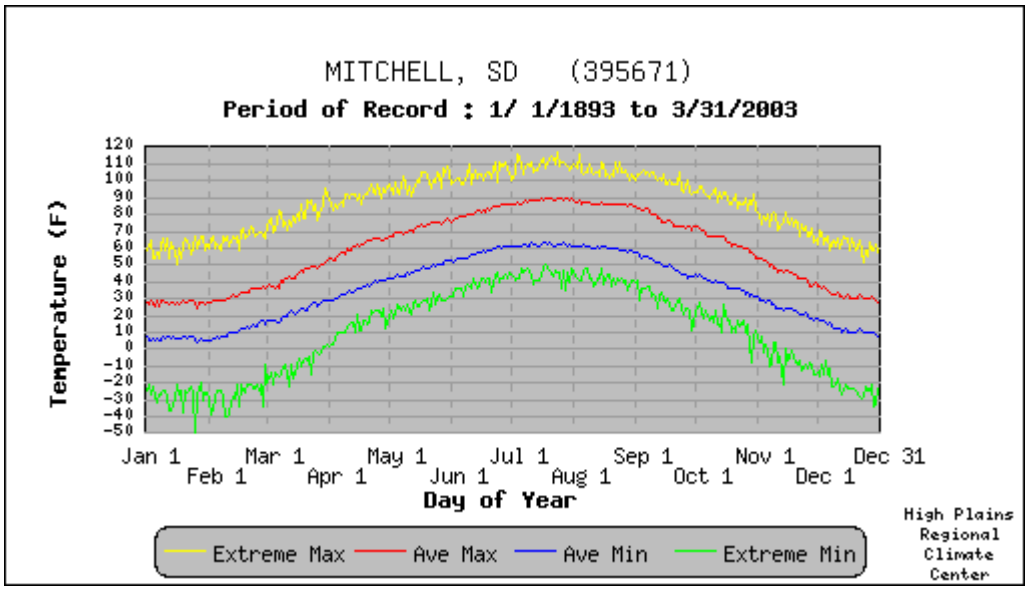
- Average precipitation recorded for the month.

3.4.2 Average Monthly Temperature[4]

Temperatures vary considerably throughout the year. The average winter temperature is 19 degrees F and the average summer temperature is 72 degrees F. Extreme temperatures for the year often range from below zero in the winter to an occasional 100 plus degree summer day.

MITCHELL, SD

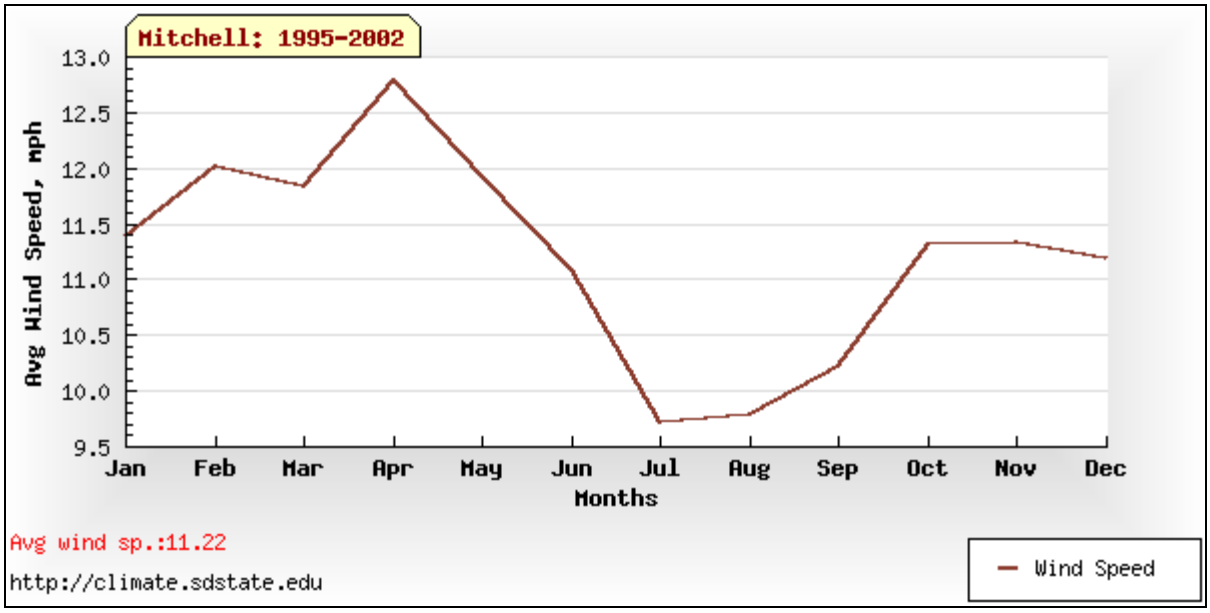
POR - Daily Temperature Averages and Extremes



- Extreme Max. is the maximum of all daily maximum temperatures recorded for the day of the year.
- Ave. Max. is the average of all daily maximum temperatures recorded for the day of the year.
- Ave. Min. is the average of all daily minimum temperatures recorded for the day of the year.
- Extreme Min. is the minimum of all daily minimum temperatures recorded for the day of the year.

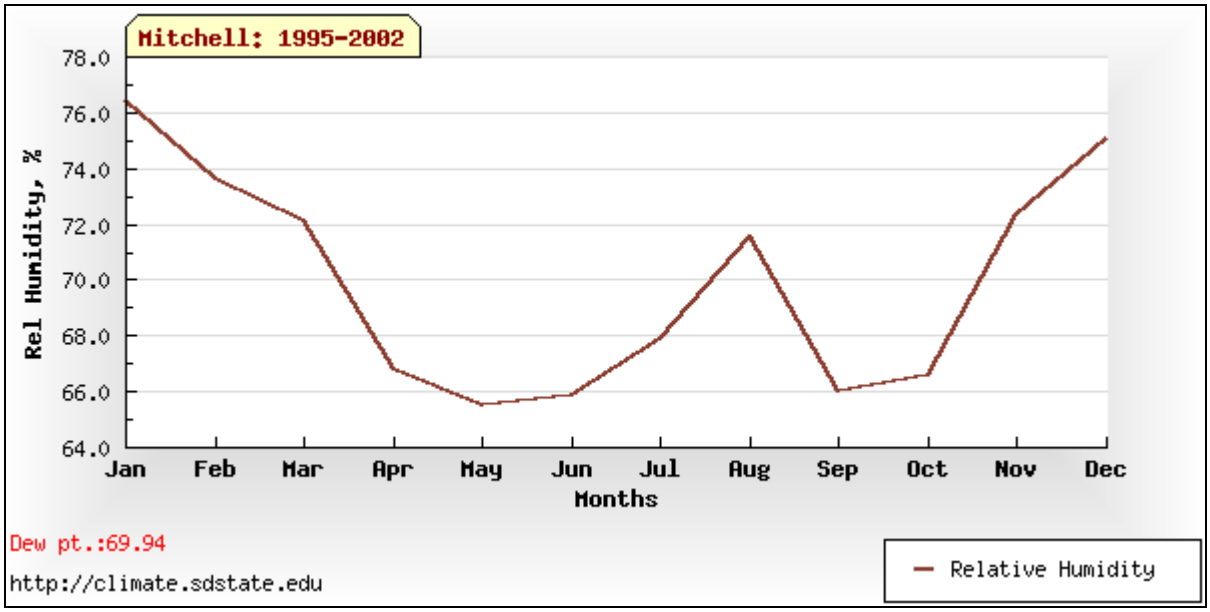
3.4.3 Average Monthly Wind Speed[4]

Average Wind

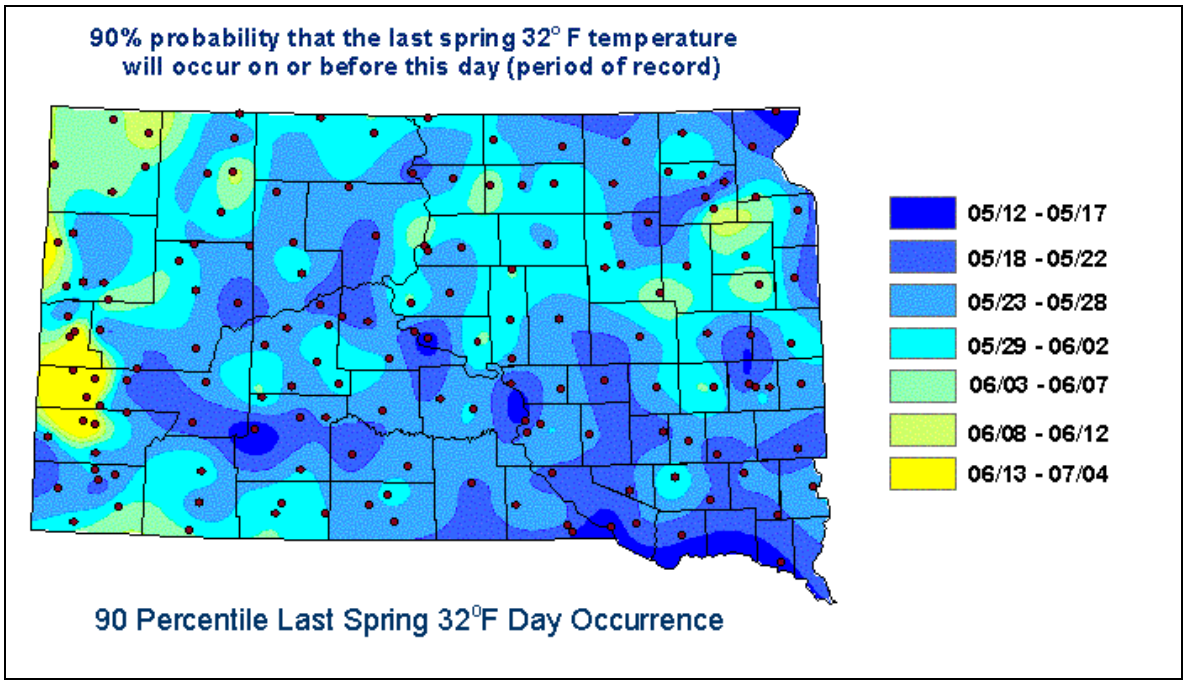


3.4.4 Average Monthly Relative Humidity[4]

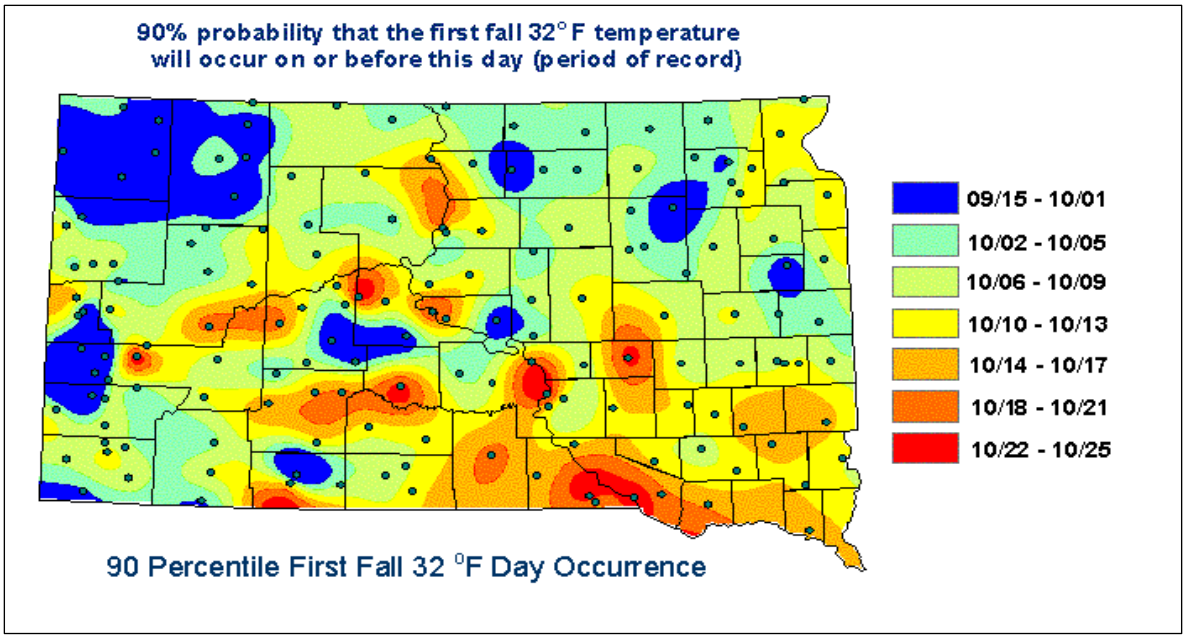
Average Humidity



3.4.5 Last Spring Freeze[4]



3.4.6 First Fall Freeze[4]



3.4.7 Climate Summary[5]

Overall monthly climatic summary of temperature and precipitation averages for the watershed.

MITCHELL, SD (395671)
Period of Record Monthly Climate Summary
Period of Record : 1/ 1/1893 to 3/31/2003

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	28.3	33.9	43.6	57.7	70.2	80.5	85.1	84.4	76.2	61.7	43.2	31.7	58.1
Average Min. Temperature (F)	7.3	11.2	20.8	34.0	47.0	57.5	62.1	60.2	49.2	35.4	22.2	11.1	34.8
Average Total Precipitation (in.)	0.58	0.91	1.13	2.96	3.14	3.38	2.77	2.51	2.22	1.58	1.17	0.35	22.69
Average Total SnowFall (in.)	5.0	6.2	4.6	2.4	0.0	0.0	0.0	0.0	0.0	0.6	5.5	2.5	26.6
Average Snow Depth (in.)	2	3	2	0	0	0	0	0	0	0	0	1	1

Percent of possible observations for period of record:
Maximum Temperature: 98.8 percent;
Minimum Temperature: 98.8 percent;
Precipitation: 98.9 percent;
Snowfall: 97.2 percent;
Snow Depth: 89.3 percent.

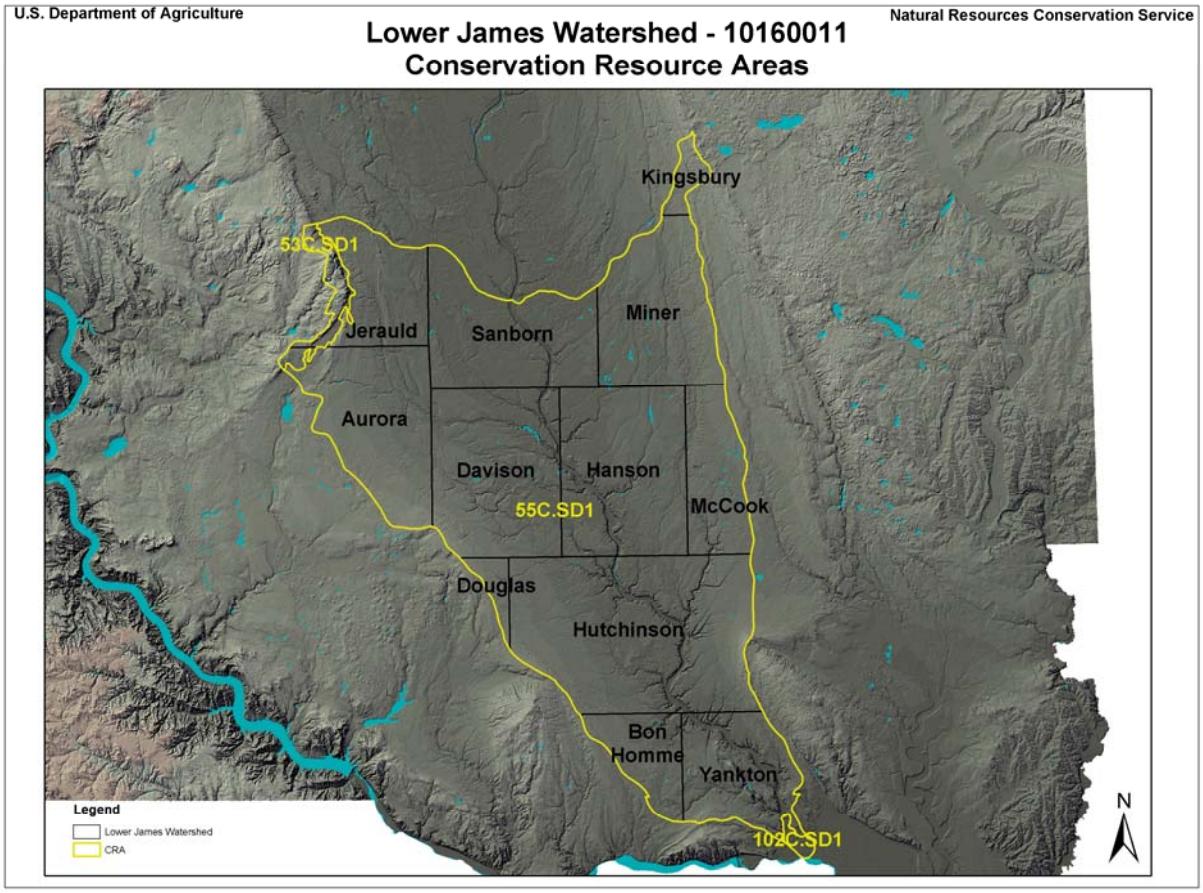
Check Station Metadata or Metadata graphics for more detail about data completeness.

4.0 RESOURCE INVENTORY

The resource inventory provides a general summary of the existing conditions of the natural resources in the watershed that are related to the soil, water, animals, plants, air, and humans (SWAPA+H). The resource descriptions provide general information on land use, land capability, soils and productivity, and prime farmland.

4.1 MAJOR LAND RESOURCE AREAS (MLRA) AND COMMON RESOURCE AREA (CRA)[1]

The MLRA's are a part of a USDA classification system that defines land as a resource for farming, ranching, forestry, engineering, recreation, and other uses. The MLRA is a broad-based geographic area characterized by a uniform pattern of soils, elevation, topography, climate, water resources, potential natural vegetation, and land uses. Large MLRAs may be further subdivided to create smaller more homogeneous resource areas. The CRAs are the basic unit of an MLRA, a subdivision based on significant geographic differences in climate, water resources, or land use and resource concerns where resource problems or treatment needs are similar. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographic boundaries of a CRA. In SD, the MLRA and CRA boundaries coincide.

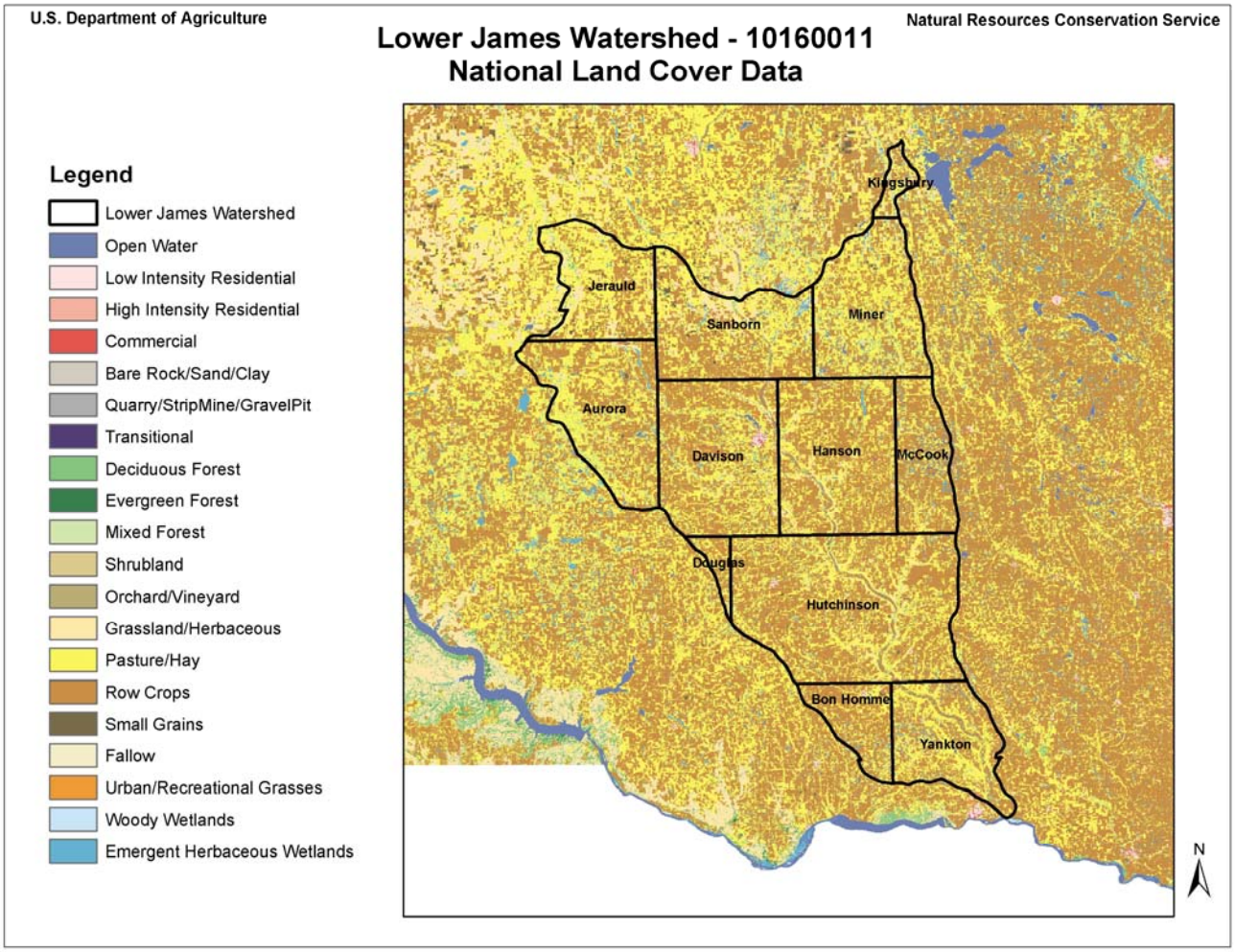


4.1.1 Common Resource Area Descriptions

Symbol	Name	Brief Description
53C.SD1	Southern Dark Brown Glaciated Plains	Slightly more than half of this area is in cropland with the major crops being small grain. The more sloping areas and adjacent to the Missouri River are used for livestock grazing. Most of the soils are deep, well-drained, and medium textured with a mesic temperature regime and mixed mineralogy.
55C.SD1	Southern Black Glaciated Plains	About 70 percent of this area is used for cropland. The principal crops are corn, soybeans grain sorghum, and sunflowers. Most of this area is nearly level to undulating till plains with some areas consisting of glacial lake plains. The drainage pattern better defined along the Missouri River. Most of the soils are deep, well-drained, and moderately well-drained, sandy to clayey and have a mesic temperature regime.
102C.SD1	Loess Uplands	Gently undulating to steep soils with long smooth slopes and well defined drainage ways formed in loess mantled uplands. There are some exposures of bedrock. Soils are commonly well-drained with some poorly drained upland waterways. Native vegetation was mixed tall and short grass prairie. The primary land use is cropland. Corn, soybeans, grain sorghum, alfalfa and oats are the major crops. Resource concerns are water and wind erosion, nutrient management and water quality.

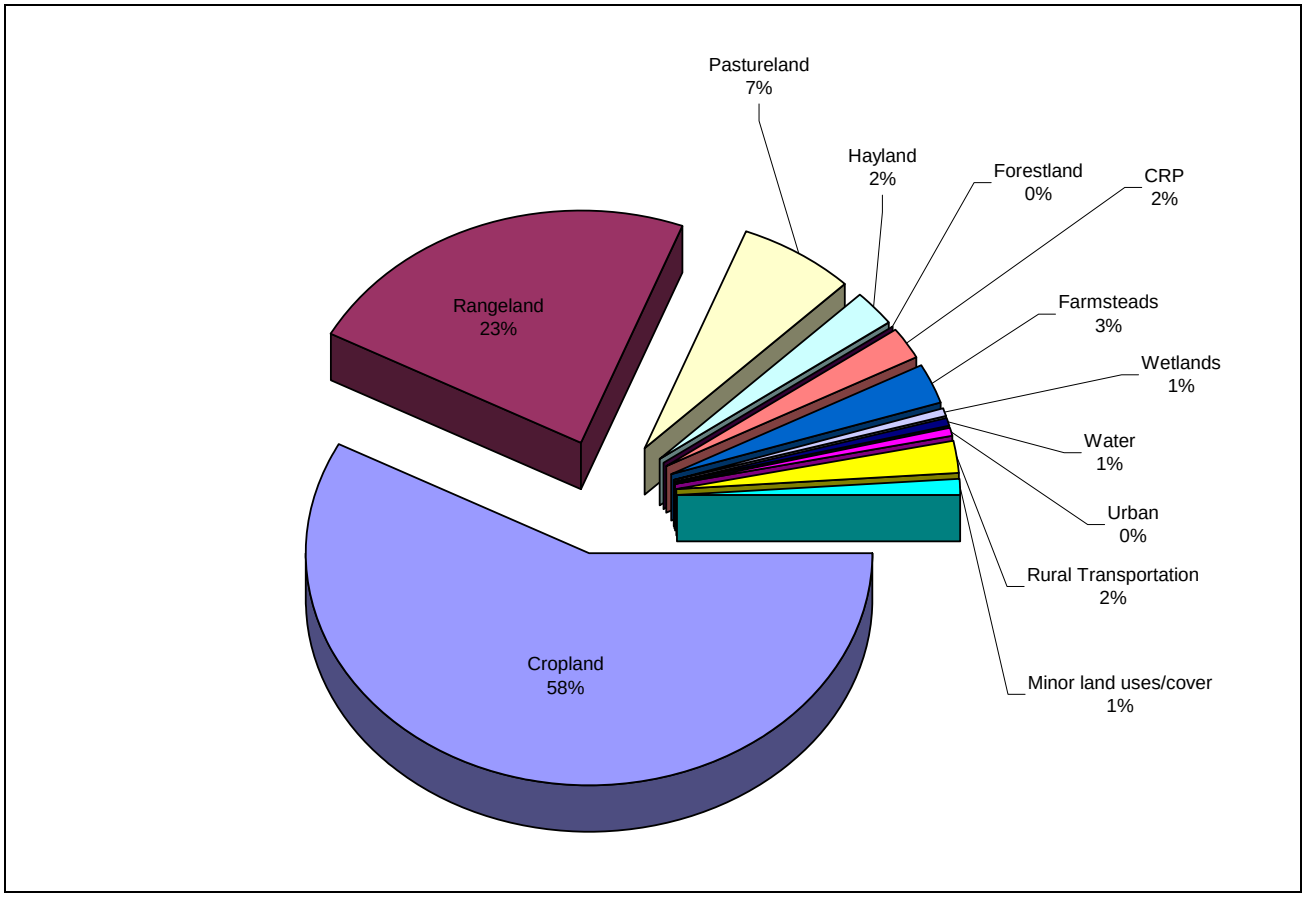
4.2 LAND COVER AND LAND USE DISTRIBUTION[6]

The National Resources Inventory (NRI) uses the term land cover/use to identify the categories that account for all the surface area in the United States. Land cover describes the different types of vegetation or other kind of material that covers the land surface. Land use is defined as the purpose of human activity on the land, it is usually, but not always, related to land cover.



4.2.1 Land Cover and Land Use Summary

Land Use Cover 1997 NRI	Acres	Percent
Cropland	1,307,000	58
Rangeland	518,600	23
Pastureland	153,100	7
Hayland	51,600	2
Forestland	3,700	0
CRP	47,300	2
Farmsteads	61,900	3
Wetlands	15,000	1
Water	11,400	1
Urban	10,800	0
Rural Transportation	50,500	2
Minor land uses/cover	27,900	1
Total	**2,258,800**	**100**



Primary Land Uses [NRI-97]

Cropland - A land cover/use category that includes areas used for the production of adapted crops for harvest. Two subcategories of cropland are recognized: cultivated and noncultivated. Cultivated cropland consists land in row crops or close-grown crops and other cultivated cropland, for example, hayland or pastureland that is in a rotation with row or close-grown crops. Noncultivated cropland includes permanent hayland and horticultural cropland.

Pastureland –A land use category managed primarily for the production of introduced or native forage plants for livestock grazing. Pastureland may consist of one species in a pure stand, a grass mixture, or a grass-legume mixture. Management consists of cultural treatments; fertilization, weed control, reseeding or renovation, and controlled grazing. For NRI, this includes land that has a vegetative cover of grasses, legumes, and/or forbs, regardless of whether or not it is being grazed by livestock.)

Hayland - A subcategory of cropland managed for the production of forage crops that are machine harvested. These crops may be grasses, legumes, or a combination. Hayland also includes land in set-aside or other short-term agricultural programs. [NRI-97]

Rangeland - A land cover/use category on which the climax or potential plant cover is composed principally of native grasses, grasslike plants, forbs or shrubs suitable for grazing and browsing, and introduced forage species that are managed like rangeland. This would include areas where introduced hardy and persistent grasses, such as crested wheatgrass, are planted and such practices as deferred grazing, burning, chaining, and rotational grazing are used, with little or no chemicals or fertilizer being applied. Grasslands, savannas, many wetlands, some deserts, and tundra are considered to be rangeland. Certain communities of low forbs and shrubs, such as mesquite, chaparral, mountain shrub, and pinyon-juniper, are also included as rangeland. [NRI-97]

Urban and built-up –Land that is used for residential, industrial, commercial, and institutional land; construction sites; public administrative sites; railroad yards; cemeteries; airports; golf courses; sanitary landfills; sewage treatment plants; water control structures and spillways; small parks (less than 10 acres) within urban and built-up areas; and transportation facilities if they are surrounded by urban areas. This also includs tracts of less than 10 acres that do not meet the above definition but are completely surrounded by urban and built-up land. Two size categories are recognized in the NRI: (i) areas 0.25 to 10 acres, and (ii) areas greater than 10 acres. [NRI-97]

Minor land cover/use includes farmsteads, farm structures, field windbreaks, barren land, and marshland.

Federal land - A land ownership category designating land that is owned by the federal government. It does not include Trust lands administered by the Bureau of Indian Affairs. No data is collected for any year that land is in this ownership category.

Rural transportation land consists of all highways, roads, railroads, and associated right-of-ways outside urban and built-up areas*;* also includes private roads to farmsteads or ranch headquarters, logging roads, and other private roads (field lanes are not included).

Conservation Reserve Program - (CRP) land is highly erodible or other environmentally sensitive acreage normally devoted to crop production which is converted to long-term vegetative cover.

4.2.2 Land Capability Class (LCC)[1]

Land capability classification (LCC) is a system of grouping soils primarily on the basis of their ability to produce common cultivated crops and pasture plants without the deterioration of the soil resource over a long period of time. The LCC reflects the physical and chemical properties, along with the topographic relief of a soil. The LCC can be used as a guide for land management decisions based on the capability or limitations of the soil.

Land Capability Class (1997 NRI Estimate)	**Acres**	**Percent**
I - slight limitations	474,100	21
II - moderate limitations	1,030,000	46
III - severe limitations	222,600	10
IV - very severe limitations	222,000	10
V - no erosion hazard, but other limitations	18,000	1
VI - very severe limitations, unsuited for cultivation, limited to pasture, range, forest	124,600	6
VII - very severe limitations, unsuited for cultivation, limited to grazing, forest, wildlife	68,500	3
VIII – misc. areas have limitations, limited to recreation, wildlife, and water supply	20,300	1
Other Acres Not Determined – includes water, rock outcrop, non-soil areas	80,500	4
Total Acres	**2,260,600**	**100**

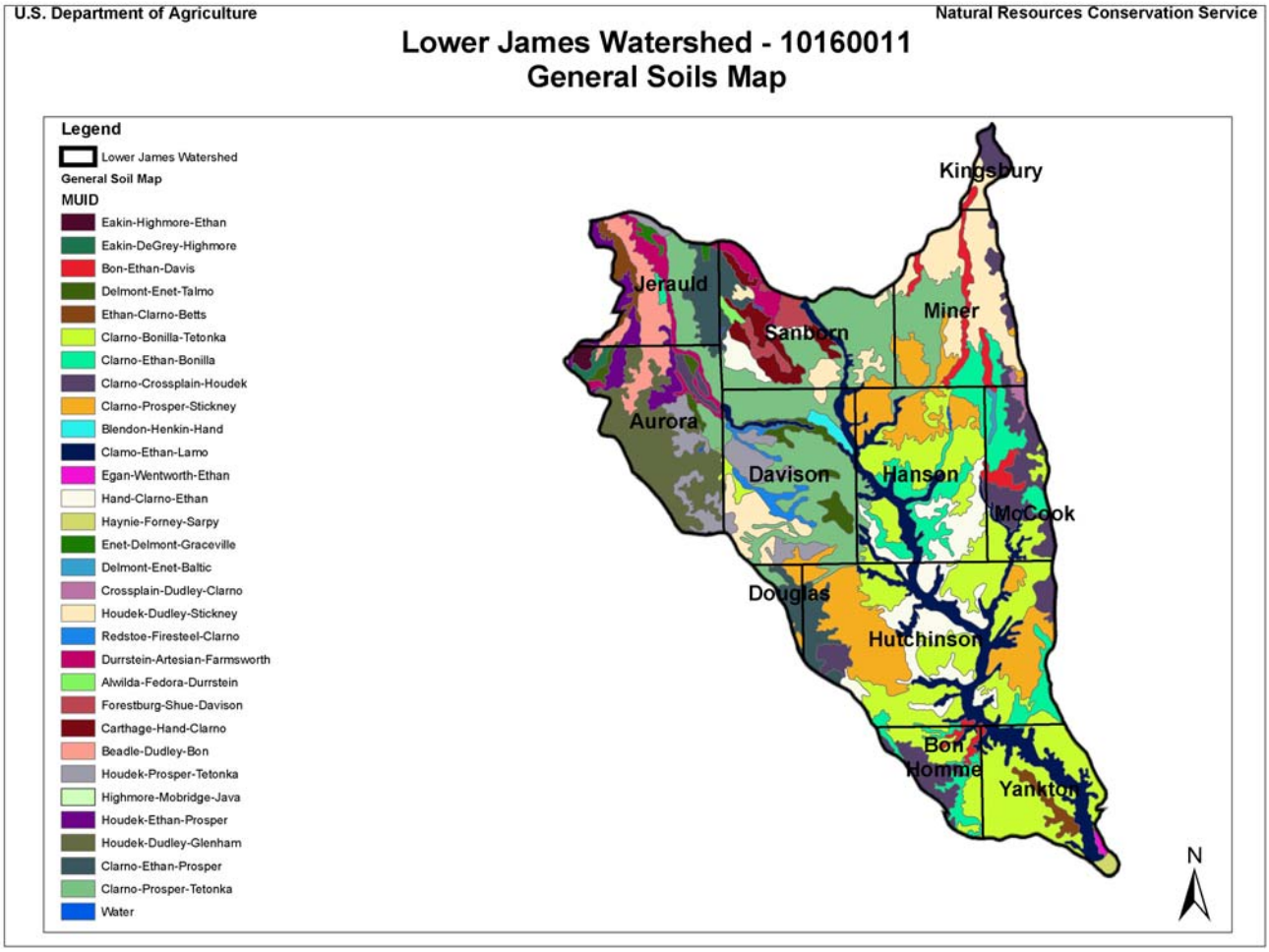
4.2.3 Prime Farmland[1]

Prime farmland, as defined by the USDA, is land that has the best combination of physical and chemical characteristics for food, feed, forage, fiber, and oilseed crop production. It must also be available for these uses. It has the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. Prime farmland soils are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding.

Prime Farmland 1997 NRI	**Acres**	**Percent**
Total Acres Prime Farmland	813,800	36
Other Acres	1,446,800	64

4.3 GENERAL SOILS

Most of the soils in the watershed were formed in the exposed glacial materials which were eroded, transported, and deposited by the repeated movement of ice across the region. The formation of soils is influenced not only by geologic forces but also topographic relief. Factors such as drainage, runoff, erosion, plant cover, and soil temperature cause soils to develop with certain characteristics and qualities.



4.3.1 General Soil Descriptions

Soils in the watershed have been placed into 30 broad groups or associations that are geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit. Each soil association has a distinctive pattern of soils, relief, drainage, and natural landscape. The dominant soils within the watershed are loamy and silty soils formed in glacial till on the uplands, loamy soils over sand and gravel on the outwash plains, and clayey and silty soils formed in alluvium on the floodplains and low terraces.

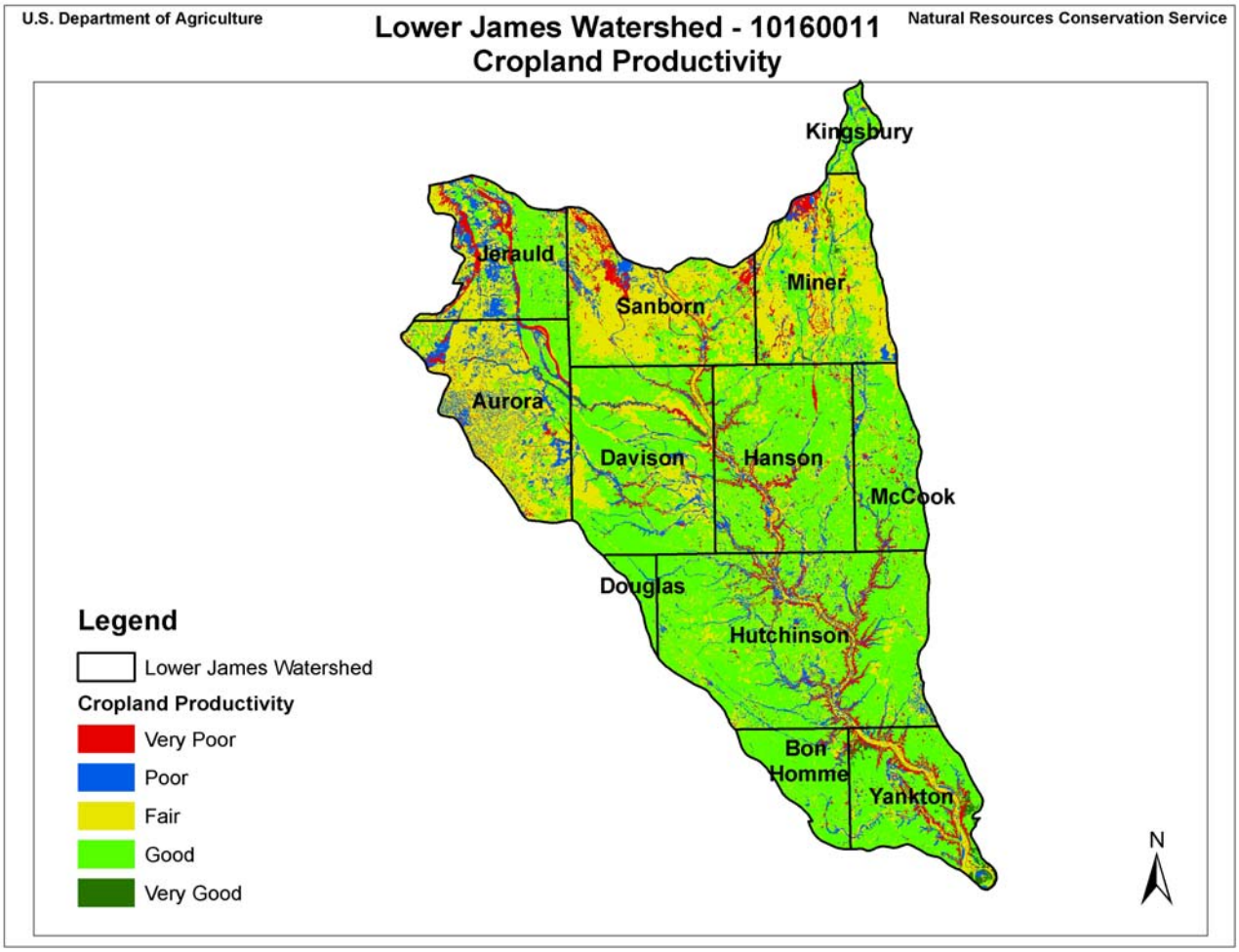
More detailed information on individual soils is available in the published county soil survey reports or from the Web Soil Survey (http://websoilsurvey.nrcs.usda.gov). The accompanying map is of a general nature and is not intended for any type of intensive planning and management.

SD076	EAKIN-HIGHMORE-ETHAN	Deep, well-drained, nearly level to strongly sloping, silty, and loamy soils on glacial till plains.
SD079	EAKIN-DEGREY-HIGHMORE	Deep, well-drained and moderately well-drained, level to gently sloping, silty, and clayey soils on glacial drift plains.
SD083	BON-ETHAN-DAVIS	Deep, well-drained, level to steep, loamy and silty soils on floodplains, fans and glacial till drainageways.
SD085	DELMONT-ENET-TALMO	Very deep, well to excessively drained, nearly level to moderately sloping loamy soils over sand and gravel on outwash plains.
SD086	ETHAN-CLARNO-BETTS	Deep, well-drained, gently sloping to steep loamy soils on glacial plains and moraines.
SD087	CLARNO-BONILLA-TETONKA	Deep, well-drained, moderately well-drained and poorly drained, nearly level to moderately sloping, loamy soils on glacial till plains.
SD088	CLARNO-ETHAN-BONILLA	Deep, well-drained and moderately well-drained, nearly level to strongly sloping, loamy soils on glacial till plains.
SD089	CLARNO-CROSSPLAIN-HOUDEK	Deep, well-drained to somewhat poorly drained, nearly level to gently sloping, loamy and clayey soil on glacial till plains.
SD090	CLARNO-PROSPER-STICKNEY	Deep, well-drained and moderately well-drained, nearly level to gently sloping, loamy and clayey soils on glacial till plains.
SD091	BLENDON-HENKIN-HAND	Deep, well-drained, level to gently sloping loamy soils on glaciofluvial plains.
SD095	CLAMO-ETHAN-LAMO	Deep, well-drained, somewhat poorly drained and poorly drained, nearly level to steep, loamy, silty and clayey soils on floodplains and glacial till drainageways.
SD096	EGAN-WENTWORTH-ETHAN	Deep, well-drained, nearly level to strongly sloping, loamy soils on glacial plains.
SD097	HAND-CLARNO-ETHAN	Deep, well-drained, nearly level to moderately steep, silty and loamy soils on glacial plains.
SD100	HAYNIE-FORNEY-SARPY	Deep, excessively drained to poorly drained, level and nearly level, sandy, loamy and clayey soils on flood plains.
SD103	ENET-DELMONT-GRACEVILLE	Deep, moderately well-drained, well-drained and somewhat excessively drained, nearly level to strongly sloping loamy soils over sand and gravel on outwash plains.

SD114	DELMONT-ENET-BALTIC	Deep, very poorly drained to somewhat excessively drained, nearly level to gently sloping, loamy and clayey soils over sand and gravel or alluvium on outwash plains.
SD115	CROSSPLAIN-DUDLEY-CLARNO	Deep, well-drained to somewhat poorly drained, nearly level, loamy soils on floodplains and terraces.
SD118	HOUDEK-DUDLEY-STICKNEY	Deep, well-drained to somewhat poorly drained, nearly level to gently sloping, loamy and clayey soils on glacial till plains.
SD120	REDSTOE-FIRESTEEL-CLARNO	Moderately deep to very deep, well drained and somewhat poorly drained, nearly level to steep, silty and loamy soils on uplands.
SD121	DURRSTEIN-ARTESIAN-FARMSWORTH	Deep, moderately well-drained to poorly drained, level and nearly level loamy and clayey soils on flood plains and terraces.
SD122	ALWILDA-FEDORA-DURRSTEIN	Deep, somewhat excessively, well and poorly drained, level to gently sloping, sandy, loamy and clayey soils on flood plains and outwash terraces.
SD123	FORESTBURG-SHUE-DAVISON	Deep, moderately well-drained and somewhat poorly drained, level to gently sloping sandy and loamy soils on glacial plains.
SD124	CARTHAGE-HAND-CLARNO	Deep, well and moderately well-drained, level to gently sloping loamy soils on glacial plains.
SD153	BEADLE-DUDLEY-BON	Deep, well to somewhat poorly drained, level to moderately sloping, loamy and clayey soils on glacial till plains.
SD155	HOUDEK-PROSPER-TETONKA	Deep, well-drained, level to moderately sloping loamy and clayey soils on glacial till plains.
SD186	HIGHMORE-MOBRIDGE-JAVA	Deep, well-drained and moderately well-drained, level to strongly sloping, silty, and loamy soils on glacial till plains.
SD188	HOUDEK-ETHAN-PROSPER	Deep, well-drained, nearly level to steep loamy soils on glacial till plains and moraines.
SD189	HOUDEK-DUDLEY-GLENHAM	Deep, well-drained to somewhat poorly drained, nearly level to gently sloping, loamy and clayey soils on glacial till plains.
SD240	CLARNO-ETHAN-PROSPER	Deep, well-drained, moderately well-drained and poorly drained, nearly level to strongly sloping, loamy and clayey soils on glacial till plains.
SD241	CLARNO-PROSPER-TETONKA	Deep, well-drained, moderately well-drained and poorly drained, nearly level to strongly sloping, loamy and clayey soils on glacial till plains.

4.4 CROPLAND PRODUCTIVITY[1]

Cropland Productivity Index (CPI) is a rating assigned to each soil map unit to rate the soil for cropland production. The rating is based on a scale of 1 to 100, with 100 being the most productive map unit in the county. The CPI assigned to each map unit is based on the physical and chemical properties of each soil type in the map unit. Properties such as slope, organic matter levels, topsoil thickness, soil texture, available water capacity, pH, and salinity levels will directly affect the productivity level of each soil type. The experience of soil scientists and university researchers is used to develop the ratings.



South Dakota

LOWER JAMES - 10160011
8-DIGIT HYDROLOGIC UNIT PROFILE

USDA Natural Resources Conservation Service (NRCS) **July 2009**

Cropland Productivity Index			Descriptions
1-25	Very Poor	Red	Soils with >15 percent slopes; soils with claypan, bedrock or gravels near the surface; high salinity soils
26-50	Poor	Blue	Soils with 9-15 percent slopes; soils with claypan, bedrock, or gravels within 20 inches of the surface
51-75	Fair	Yellow	Soils with 6-9 percent slopes; soils with claypan, bedrock, or gravels at 20 to 40 inches of the surface
76-89	Good	Light Green	Soils with 2-6 percent slopes
90-100	Very Good	Dark Green	Silty or loamy soils with high soil organic matter levels

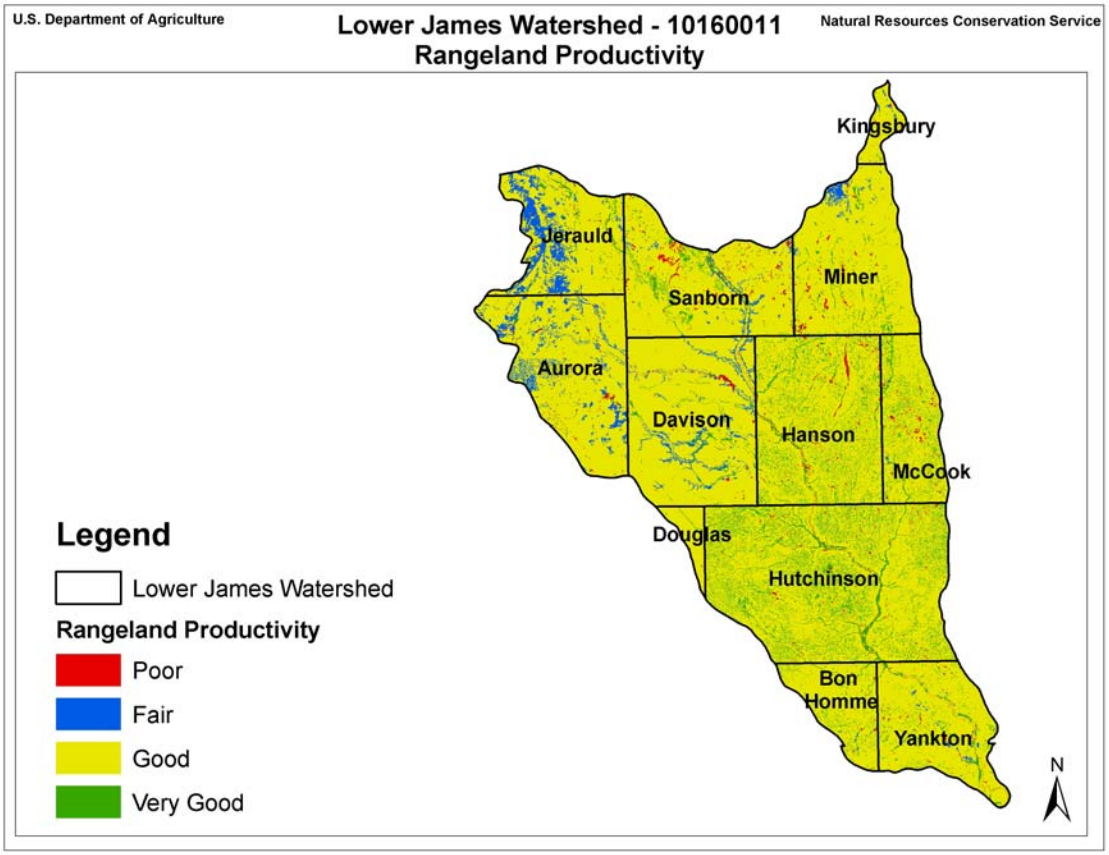
4.5 RANGELAND PRODUCTION (NORMAL YEAR)[1]

Rangeland has a native vegetation of grasses, grasslike plants, forbs, and shrubs. In many areas, introduced forage species are also managed as rangeland. The vegetation is suitable for grazing and browsing by animals. Rangeland includes natural grasslands, savannahs, many wetlands and deserts, tundra, and certain shrub and forb communities.

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Effective management is based on the relationship between the soils, vegetation, and water.

Total production is the amount of vegetation that can be expected to grow annually on well managed rangeland. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants. It is expressed in pounds per acre of air-dry vegetation for normal years.

Yield and production values are represented as a single value for the map unit. They are calculated based on a weighted average.



Rangeland Normal Year Production			Descriptions
1-1700 lbs/Ac	Poor	Red	Low rainfall areas or shallow soils
1701-2600 lbs/Ac	Fair	Blue	Areas that are high in sodium or salts or shallow to bedrock or gravel
2601-4500 lbs/Ac	Good	Yellow	Areas where there is no additional moisture and the soil properties do not influence the grasses
4501-9000 lbs/Ac	Very Good	Light Green	Low lying areas that receive additional moisture

5.0 RESOURCE CONCERNS

Resource concerns or problems are issues related to the environment that impact the health, productivity, or condition of natural resources in a watershed. The most common resource concerns are associated with the SWAPA+H.

5.1 SUMMARY OF RESOURCE CONCERNS[1]

Specific resource concerns have been identified for each major land use at the state level. The following table is a summary of state level concerns. The resource concerns specific to the watershed have been identified and evaluated by land use in the watershed assessments.

SWAPA + H Concerns	Specific Resource Concerns/Issue	Pasture/Hay	Cropland	Rangeland	Forest	Wildlife
Soil Erosion	Streambank	X	X	X	X	X
	Sheet and Rill		X			
	Wind		X			
	Ephemeral Gully		X			
	Classic Gully		X			
Soil Condition	Organic Matter		X			
	Excess Nitrogen		X			
	Excess Phosphorous		X			
	Compaction		X			
	Soil Salinity		X			
	Rangeland Site Stability		X			
Water Quantity	Inefficient Water Use on Irrigated Lands		X			
Water Quality	Harmful levels of Pesticides in Ground Water		X			
	Harmful levels of Pesticides in Surface Water		X			
	Nutrients and Organics in Ground Water		X			
	Nutrients and Organics in Surface Water		X			
	Suspended Sediment in Surface Water	X	X	X	X	X
Plant Suitability	Plants Not Adapted to Site	X				
Plant Condition	Productivity Health and Vigor	X		X	X	
	Forage Quality and Palatability	X		X	X	
	Noxious and Invasive Plants	X		X		X
Domestic Animals	Inadequate Feed and Forage Quantities and Quality	X		X	X	
	Inadequate Stock Water	X		X	X	
Fish and Wildlife	Species of Concern	X	X	X	X	X
	Inadequate Cover and Shelter	X	X	X	X	X

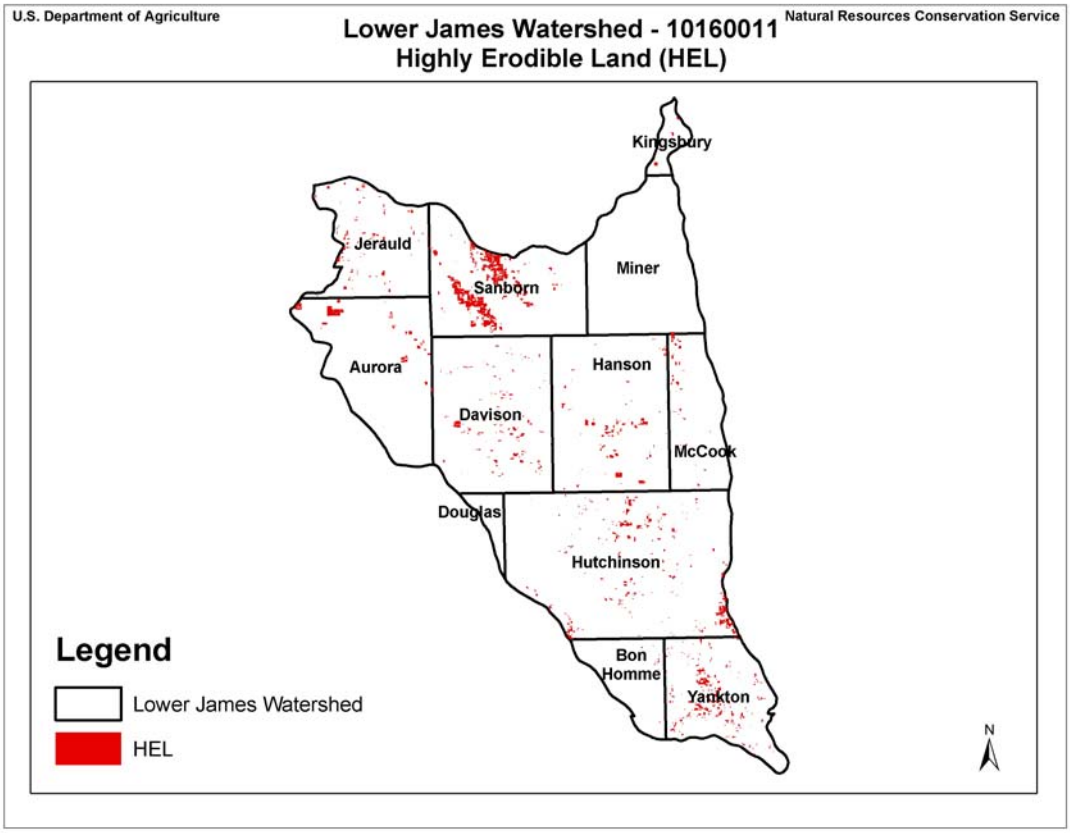
5.2 SOIL EROSION - WIND AND WATER[1]

Soil erosion is defined as the detachment and movement of topsoil, or soil material from the upper part of the soil profile, through the action of wind or running water, especially as a result of changes associated with human activity related to agricultural practices. Soil erosion from water includes rill, gully, and sheet.

Soil loss wind and water (cultivated cropland, hayland, pastureland and CRP).	Erosion	Average Annual Erosion Rate (T/Ac/Yr)	Acres	Total (T/Yr)
	Wind (WEQ)	1.17	1,559,000	1,824,000
	Water (USLE)	1.48	1,559,000	2,307,300

5.3 HIGHLY ERODIBLE LAND (HEL)

The basis for identifying highly erodible land (HEL) is the erodibility index (EI) of a soil map unit. The "EI" of a soil is determined by dividing the potential erodibility for each soil by the soil loss tolerance (T) value established for the soil as of January 1, 1990. The "T" value represents the maximum annual rate of soil erosion that can take place without causing a decline in long-term productivity. A soil map unit with an "EI" of eight or more is a highly erodible soil map unit. Refer to the National Food Security Act Manual (NFSAM) for further guidance.



5.4 WATER RESOURCE CONSIDERATIONS

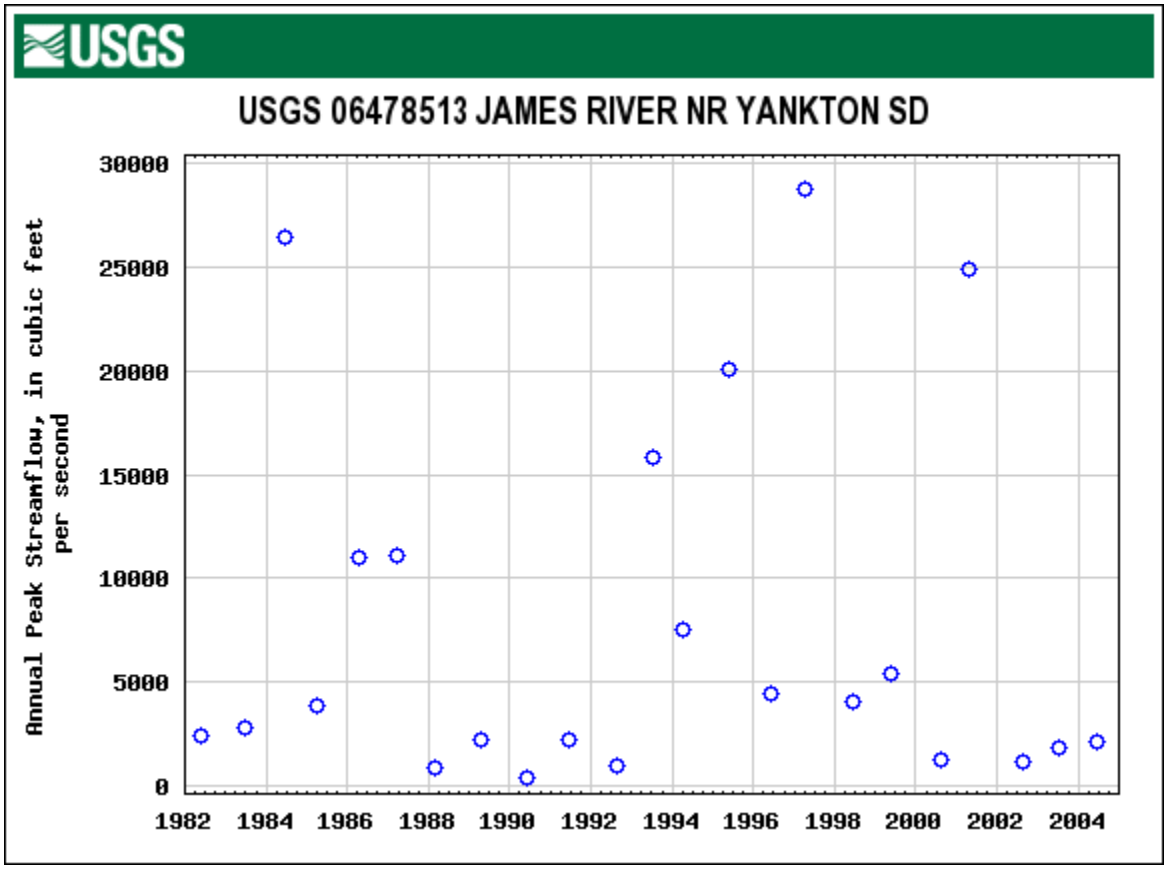
5.4.1 Water Resources Table[1]

The NRI data collected for streams and water bodies within the watershed.

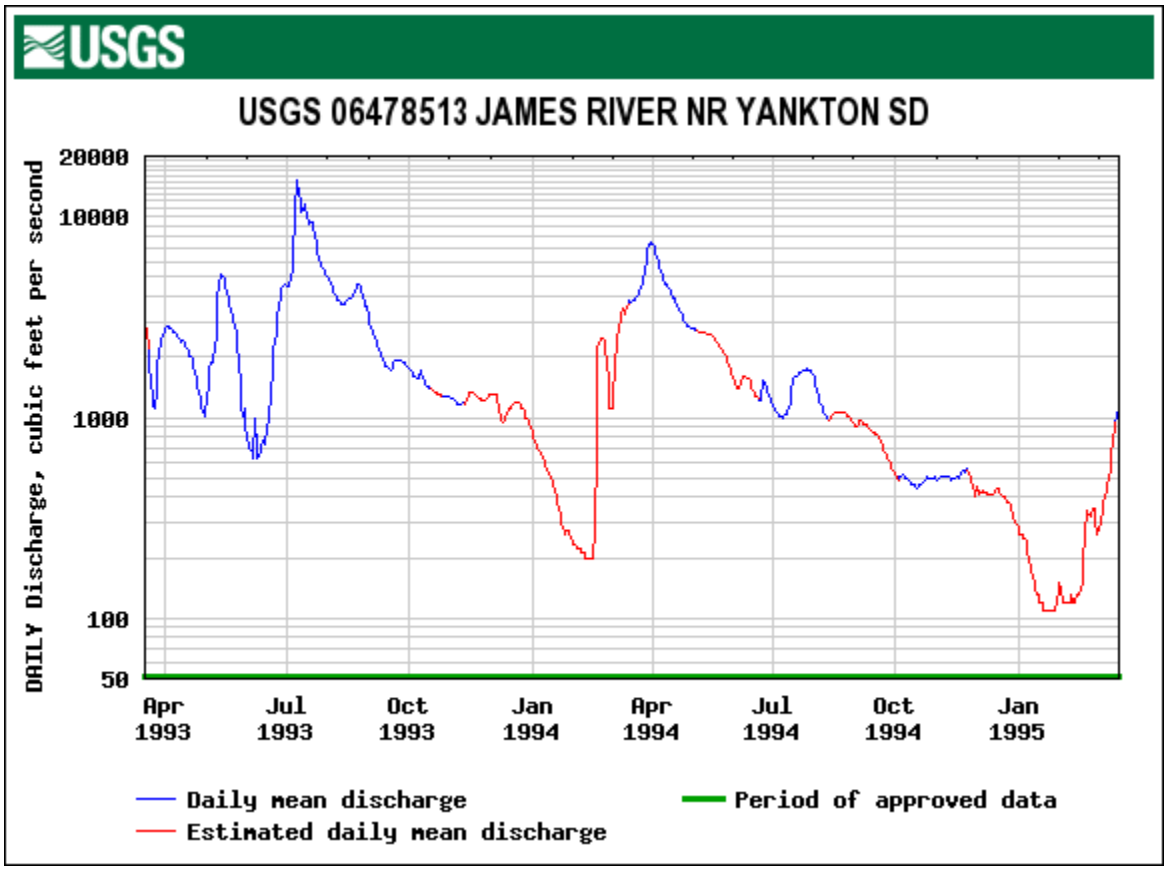
Water Resources !997 NRI	Acres	Percent
Streams <660' wide and water bodies <40 Ac	8,000	0.4
Streams >660' wide and water bodies >40 Ac	3,400	0.2

5.4.2 Peak Stream Flow[6]

The USGS collected peak stream flow data on the James River for this report. Collection sites located within the Lower James Watershed will represent historic peak stream flows for the watershed. The site is located near Yankton, SD. The gauging station USGS used to collect peak stream flow data were also used to collect daily discharge data within the watershed. The site has a drainage area of 16,794 square miles. This station collected peak stream flow data from 1930 through 1965.



5.4.3 Daily Discharge[6]



5.4.4 Groundwater[1]

Several major and minor aquifers of varying depths and water quality are utilized for domestic and agricultural purposes. Shallow aquifers tend to be smaller and usually have higher quality water but are also more vulnerable to leaching of nutrients, pesticides, organic waste, and pathogens. Recharge of shallow aquifers occurs primarily from infiltration of precipitation but also from wetlands, lakes, and streams. Deep aquifers occur between confining layers of impermeable bedrock. The quality of this water is often variable but usually of lower quality than that of shallow aquifers. As a result of the confining layers protecting these aquifers and the depth at which they occur, they are less susceptible to leaching and other surface activities and impacts.

There are 15 major aquifers in the watershed; 11 are in glacial drift and 4 bedrock aquifers.

Glacial drift includes all rock material transported by glacier ice even though subsequently affected by wind or water. It can be divided into till and outwash. The till is unstratified and unsorted drift deposited by ice without subsequent movement by wind or water. Generally, till is composed of a heterogeneous mixture of clay, silt, and sand that contain lesser amounts of rock fragments ranging in size from gravel to huge boulders. Because of the large clay content, the till has low permeability and usually is a poor source of water. However, till locally contains small sand lenses that may yield as much as five gallons per minute.

Outwash and loess are considered stratified drift, most of which has been re-worked and deposited by wind or water. Outwash is material deposited by melt water that flowed on or away from the glacier; loess is material deposited by wind. Outwash consisting of sorted gravel, sand, and silt constitutes the most permeable glacial aquifers.

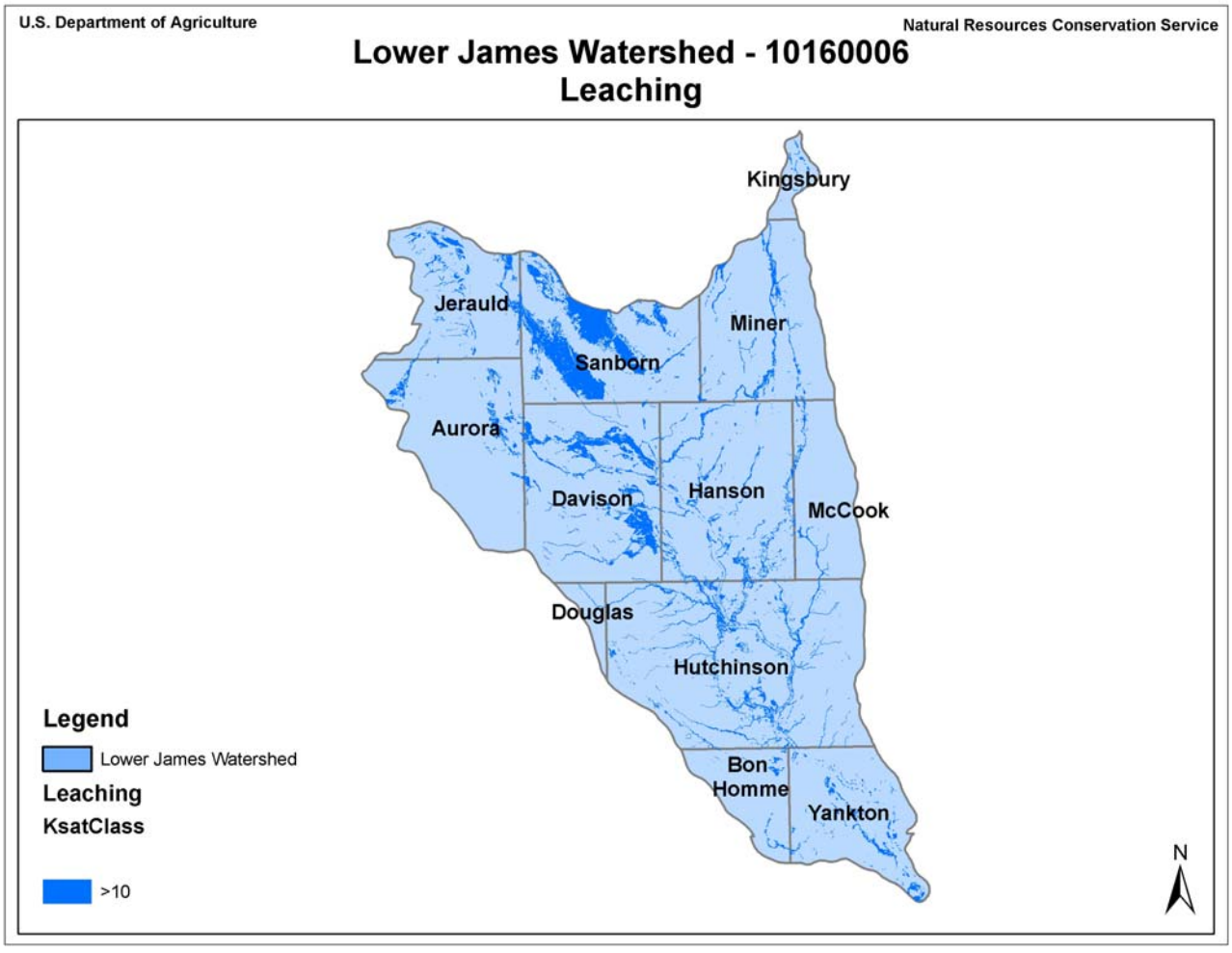
Aquifers in glacial drift:

Floyd
Plum Creek
Ethan
Warren
Alexandria
Crow Lake
Lower James - Missouri
Warren
Corsica
White Lake
Choteau

Bedrock Aquifers:

Niobrara
Codell Sandstone Member of the Carlile Shale
Dakota
Sioux Quartzite Wash

The NRCS makes groundwater leaching assessments based on a soils “saturated hydraulic conductivity” (Ksat). Ksat refers to the ease with which pores in a saturated soil transmit water and is expressed in terms of micrometers per second. Soil map units that have a Ksat value of 10 micrometers/second or greater and with <6 percent slope would be considered to have a “high leaching risk”.



5.4.5 Public Water Supply Systems[7]

Approximately 670 public water systems (PWS) currently exist in SD. The public water supply systems within this watershed rely on both surface and ground water sources. These systems meet the needs of rural and municipal households as well as industrial and agricultural needs. Protection and conservation of both surface and groundwater sources is critical.

Primary enforcement of the federal Safe Drinking Water Act (SDWA) began in 1983. The SD Drinking Water Program, part of the Department of Environment and Natural Resources (DENR), develops and enforces the SD Drinking Water Regulations (http://www.state.sd.us/denr/des/drinking/regs.htm) that apply to public water systems in the state. To see a list of drinking water contaminants that the Drinking Water Program regulates visit the Drinking Water Standards Web page at http://www.state.sd.us/denr/des/drinking/standard.htm. Plans and specifications reviews are part of the department's regulatory efforts to protect the state's surface and groundwater resources and public health. The areas of responsibility include design criteria development, technical assistance, and plan approvals for the Drinking Water, Groundwater Quality, Minerals and Mining, Surface Water and Waste Management Programs within the Division of Environmental Services.

5.4.6 Surface Waters - Designated Beneficial Uses[7]

Surface waters in SD are classified for one or more of the following beneficial uses:

(1) Domestic water supply waters;
(2) Cold water permanent fish life propagation waters;
(3) Cold water marginal fish life propagation waters;
(4) Warm water permanent fish life propagation waters;
(5) Warm water semipermanent fish life propagation waters;
(6) Warm water marginal fish life propagation waters;
(7) Immersion recreation waters;
(8) Limited contact recreation waters;
(9) Fish and wildlife propagation, recreation, and stock watering waters;
(10) Irrigation waters; and
(11) Commerce and industry waters.

All streams, in SD, are assigned the beneficial uses (9) and (10) unless otherwise stated. All lakes, in SD, are assigned the beneficial uses of (7), (8), and (9).

5.4.7 Total Maximum Daily Loads (TMDLs) 2008 Report[7]

Section 303(d) of the federal Clean Water Act requires that states develop TMDLs for water bodies that are impaired. The SD DENR is responsible for managing the monitoring of water bodies and development of TMDLs in SD. The TMDLs are calculations to determine the sum allowable load of a pollutant from all contributing point and nonpoint sources, that a waterbody can receive and still meet the applicable water quality standards. The TMDLs must be developed for water bodies that do not meet the water quality standards. The TMDLs developed by DENR are required to be approved by the Environmental Protection Agency (EPA) and to public notice the TMDL.

The following data was presented by the DENR in "THE 2008 SOUTH DAKOTA INTEGRATED REPORT FOR SURFACE WATER QUALITY ASSESSMENT." This information represents the current status of water quality for waters within Lower James Watershed.

Lower James River					
Segment or Lake Name	**Segment or Lake Location**	**Impairment**	**Status**	**Status Date**	**Initial Listing**
Lakes					
Beaver Lake	Yankton County	TSI	Water impaired requires a TMDL	2008	2004
Lake Carthage	Miner County	TSI	Water impaired requires a TMDL	2008	2004
Lake Hanson	Hanson County	TSI Sediment	TMDL Approved	6/3/04	2002
Menno Lake	Hutchinson County	Insufficient Data	Insufficient Data	2008	2004
Lake Mitchell	Davison County	Nutrients	Special Approval	4/22/97	1996
Twin Lakes	Sanborn County	TSI	Water impaired requires a TMDL	2008	2004
Wilmarth Lake	Aurora County	TSI	Water impaired requires a TMDL	2008	2004
Streams					
West Fork Firesteel Creek	Davison County	Nutrients	Special Approval	4/22/97	1996
Dawson Creek	Hutchison County	Fecal Coliform	Water impaired requires a TMDL	2008	2008
Sand Creek	Sanborn County	TSS	Water impaired requires a TMDL	2008	2004
James River	Hutchinson County	TSS	Water impaired requires a TMDL	2008	1998
James River	Yankton	Fecal Coliform TSS	Water impaired requires a TMDL	2008	1998
Wolf Creek	McCook, Miner, Hutchinson Counties	TSS	Water impaired requires a TMDL	2008	2008

Impairments

DO -	Dissolved Oxygen, results from the photosynthetic and respiratory activities of the biota in the water body. DO is essential for aquatic life.
pH -	Acidity/Alkalinity the measure of the hydrogen ion concentration. pH can affect many chemical reactions in water.
TSI -	Carlson's (1977) Trophic State Indices (TSI), Carlson's TSI is a measure of productivity in a lake or . Typically Secchi depth, chlorophyll *a*, and phosphorus measurements are used to calculate a mean TSI value.
TSS -	Total Suspended Solids, the organic and inorganic material left on a standard glass fiber filter (0.45 micron) after a water sample is filtered through it. TSS can be used to measure the volume of solids in a water body. Too much suspended solids can be harmful to the biota in a stream.

TMDL Project Status	
Assessment Initiated -	Data for developing the TMDL is being collected.
Delist -	A water body has been removed from the TMDL list. Delisting may occur when a TMDL is approved by EPA, water quality standards are met, a water body was listed in error, additional state effluent controls address water quality problems, s have been breached and are no longer a viable water body, or data assessment methodologies have been modified.
Delist* -	Water quality standards have been met; however, a TMDL was completed because an assessment had already been initiated while the segment was previously listed.
Not Initiated -	Projects are proposed and waiting final funding to begin assessment.
Special Approvals -	A water body that had sufficient data to write a TMDL before the first 303(d) list was published.
TMDL in Public Notice -	During the public notice phase, a TMDL has been developed and is ready for public review and comment. Comments received are reviewed and considered before submitting a final TMDL to EPA for approval.
TMDL Public Noticed -	The public notice comment period has passed. Comments received are being reviewed and considered before submitting a final TMDL to EPA for approval.
TMDL Approved -	EPA has approved a TMDL as submitted by the state.
TMDL Not Required -	Water body is meeting its beneficial uses.

Watershed Projects, Plans, Studies, and Assessments

Lower James Watershed Projects, Plans, Studies, and Assessments					
NRCS Watershed Projects			NRCS Watershed Plans, Studies, and Assessments		
Name	Status	Goals:	Name	Status	Goals
None	NA	NA	None	NA	NA
SD DENR Water Quality Projects or Conservation District Projects Lower James Assessment Project	Status Ongoing	Results: Develop TMDL			

5.4.8 Confined Animal Feeding Operations (CAFO)[8]

The SD DENR is the state agency responsible for regulating animal feeding operations. A CAFO is a lot or facility that stables or confines and feeds or maintains animals for a total of 45 days or more in any 12-month period and meets the criteria for either a large, medium, or small concentrated animal feeding operation. Concentrated Animal Feeding Operations are regulated by a general water pollution control permit. Producers must submit plans for manure management systems to DENR. These plans must meet DENR design requirements and be approved by a department engineer.

Livestock production is an important industry within the Lower James watershed. Farms and ranches raise beef cattle, dairy cattle, hogs, and poultry.

CAFO Watershed Summary					
Animal/Operation Type	Cattle	Dairy	Swine	Poultry	Not Specified
Number of Permitted Farms	20	4	29	9	
- Number of Permitted Animals	38,690	3,470	154,233	2,368	450
- Permitted Acres for Waste Management	27,833	4,157	30,943	19,380	52,806
Partially Permitted Farms					
- # of Animals Permitted					
- Total Animals					
- # of Acres					
Approved Farms Not yet permitted	3	1	1		
- # of Animals	2,504	50	725		
- # of Acres	1,010		908		1,093
Operations Under Review					
- # of Animals					
- # of Acres					
Other Acres Not Specified					

Current as of May 2007

5.5 RESOURCES OF SPECIAL CONCERN

In support of federal actions proposed by the NRCS, the agency prepares programmatic, policy, legislative, and other Environmental Assessments (EA) or Environmental Impact Statements (EIS), as necessary, for environmental compliance with federal regulations. All conservation programs administered by the agency have a program level EA or EIS. Additionally, the NRCS policy requires that for all projects or conservation practices where the NRCS provides financial or technical assistance, a site-specific environmental evaluation (EE) of practice effects is completed to ensure the proposed action has been sufficiently analyzed in an existing NRCS environmental document.

The SD NRCS site-specific EE reviews and evaluates the proposed activity impacts with regard to the following federal laws, Executive Orders, regulations, or agency policy as applicable:

National Historic Preservation Act (1966), as amended, and implementing regulations found at 36 CFR Part 800;
Endangered Species Act (1973), as amended;
Fish and Wildlife Coordination Act (1943), as amended;
Executive Order 11988 (1987) - Floodplain Management;
Executive Order 13112 (1999) - Invasive Species;
Migratory Bird Treaty Act (1918), as amended, and Executive Order 13186 – Responsibility of Federal Agencies to Protect Migratory Birds;
The NRCS policy General Manual (GM), Title 190, Part 410.23 - Natural Areas;
Farmland Protection Policy Act and 7 CFR 658.5 regulations;
The NRCS policy GM, Title 190, Part 411.03(d) Riparian Areas;
Clean Water Act and Waters of the U.S. (1972);
Executive Order 11990 “Protection of Wetlands,” the Food Security Act of 1985, revised NRCS Wetland Technical Assistance Policy - 7 CFR Part 650 (1997);
Wild and Scenic Rivers Act – PL 90-542.

5.5.1 Endangered and Threatened Species[1]

Status of federally and state listed threatened and endangered species in the watershed.

Scientific Name	Common Name	Federal Status	State Status
Haliaeetus leucocephalus	Bald Eagle		Threatened
Notropis heterolepi	Blacknose Shiner		Endangered
Heterodon platirhinos	Eastern Hognose Snake		Threatened
Graptemys pseudogeographica	False Map Turtle		Threatened
Lampsilis higginsii	Higgins Eye Pearly Mussel	Endangered	
Sterna antillarum	Interior Least Turn	Endangered	Endangered
Tropidoclonian lineatum	Lined Snake		Threatened
Lontra Canadensis	Northern River Otter		Threatened
Scaphirhynchus albus	Pallid Sturgeon	Endangered	Endangered
Charadius melodus	Piping Plover	Threatened	Threatened
Leptodea leptodon	Scaleshell Mussel	Endangered	
Macrhybopsis meeki	Sicklefin Chub		Endangered
Macrhybopsis gelida	Sturgeon Chub		Threatened
Notropis topeka	Topeka Shiner	Endangered	
Platanthera praeclara	Western Prairie Fringed Orchid	Threatened	
Grus americana	Whooping Crane	Endangered	Endangered

5.6 RESOURCE ACCOMPLISHMENTS

5.6.1 Performance Results Systems (PRS) Data

The PRS is an Integrated Accountability System (IAS) application that collects practice-based information for NRCS conservation programs. Currently, the PRS program is used by NRCS employees and partners to record performance data on conservation plans and practices that are planned and applied.

PRS Data	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09
Applied Conservation Treatment (Units/Acres)						
Access Control (472) (ac)						21
Comprehensive Nutrient Management Plan (100) (no)		4	9	11	12	
Conservation Cover (327) (ac)	1,774	653	4,832	357	293	16
Conservation Crop Rotation (328) (ac)	12,844	21,175	23,350	204	292	2
Cover Crop						6
Critical Area Planting (342) (ac)	6	9	53		15	
Dike (356) (ft)	160				1	
Diversion (362) (ft)						
Fence (382) (ft)	54,259	1,154	1,225	77	91	
Filter Strip (393) (ac)	1,341	88,153	108,681	30	58	
Forage Harvest Management (511) (ac)	2,673	758	868	9	11	
Grassed Waterway (412) (ac)			14	2		
Heavy Use Area		14	45			
Hedgerow Planting (422) (ft)	3,495					
Irrigation System, Sprinkler (442) (ac)						
Irrigation Water Management (449) (ac)	511					
Mulching (484) (ac)		77	123	72	53	
Nutrient Management (590) (ac)	9,436	7,698	5,999	115	136	
Obstruction Removal				3		
Pasture and Hay Planting (512) (ac)	349	244	332	11	1	
Pest Management (595) (ac)	12,942	19,077	16,231	427	761	19
Pipeline (516) (ft)	25,446	59,346	40,548	24	21	
Pond (378) (no)	6	5	6	4	3	
Prescribed Burn (338) (ac)	19					
Prescribed Grazing (528) (ac)	13,856	10,103	2,591	36	63	
Pumping Plant (533) (no)		4	3	1	6	
Range Planting (550) (ac)		200	47	1	1	
Residue and Tillage Mgmt, No-Till/Strip Till/Direct Seed (329) (ac)	1,375	18	1,853	111		
Residue and Tillage Mgmt, Mulch Till (345) (ac)	8,078	8,869	7,284	111		
Residue and Tillage Mgmt, Ridge Till (346) (ac)				1		
Residue Management, Seasonal (344) (ac)	1,669	8,877	3,469		10	
Restoration and Management of Declining Habitats (643) (ac)	284	6	1,516	25	14	
Riparian Forest Buffer (391) (ac)	45	48	76	4	6	
Riparian Herbaceous Cover (390) (ac)		185	171	12	27	

South Dakota

LOWER JAMES - 10160011
8-DIGIT HYDROLOGIC UNIT PROFILE

USDA Natural Resources Conservation Service (NRCS) **July 2009**

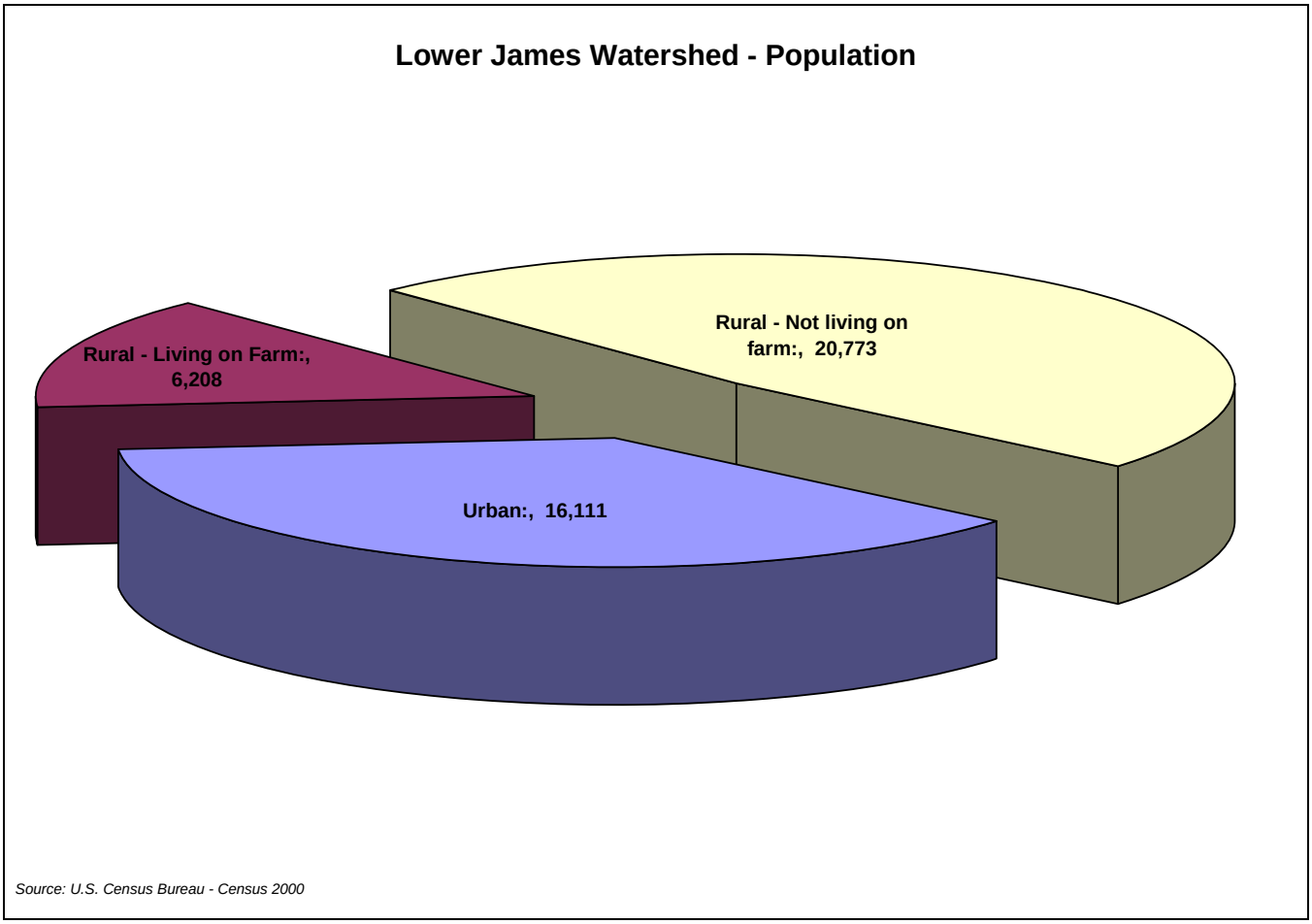
PRS Data	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09
Applied Conservation Treatment (Units/Acres)						
Sediment Basin (350) (no)				5	1	
Salinity and Sodic Soil Management (610) (ac)		8	107	6	6	
Soil Salinity Management (571) (ac)	76	190	32			
Upland Wildlife Habitat Management (645) (ac)	1,757	3,736	3,961	202	321	17
Use Exclusion	4,354	3,316	5,482	242	409	
Waste Storage Facility (313) (no)		2	8	18	3	
Water Well (642) (no)	13	9	10	12	7	
Watering Facility (614) (no)	10	38	34	29	24	1
Well Decommissioning	1				1	
Wetland Creation, Enhancement, and Restoration (658, 659, 657) (ac)	1,153	1,080	1,056	111	164	4
Wetland Wildlife Habitat Management (644) (ac)	262	1,356	408	44	32	
Windbreak/Shelterbelts (380 and 650) (ft)	353,047	140,163	272,181	127	68	

6.0 CENSUS AND SOCIAL DATA[9]

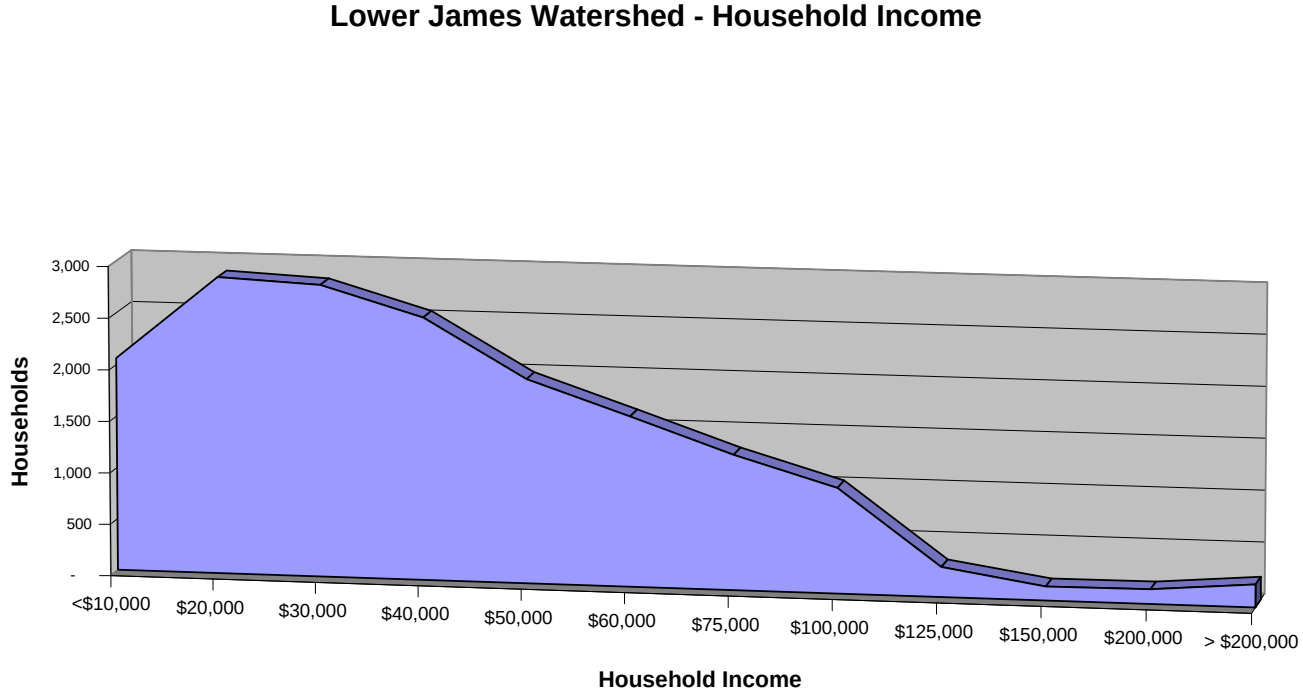
This section provides basic social data gathered during the 2002 Census

6.1 POPULATION CHART

Census data for the rural and urban populations within the watershed.

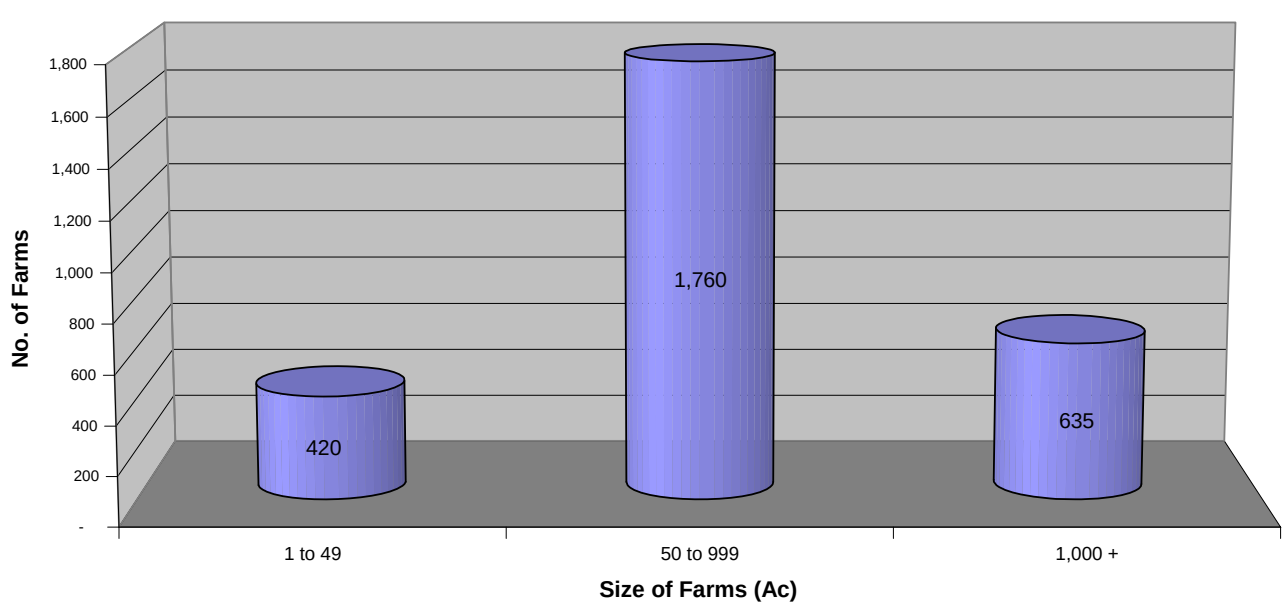


6.2 HOUSEHOLD INCOME



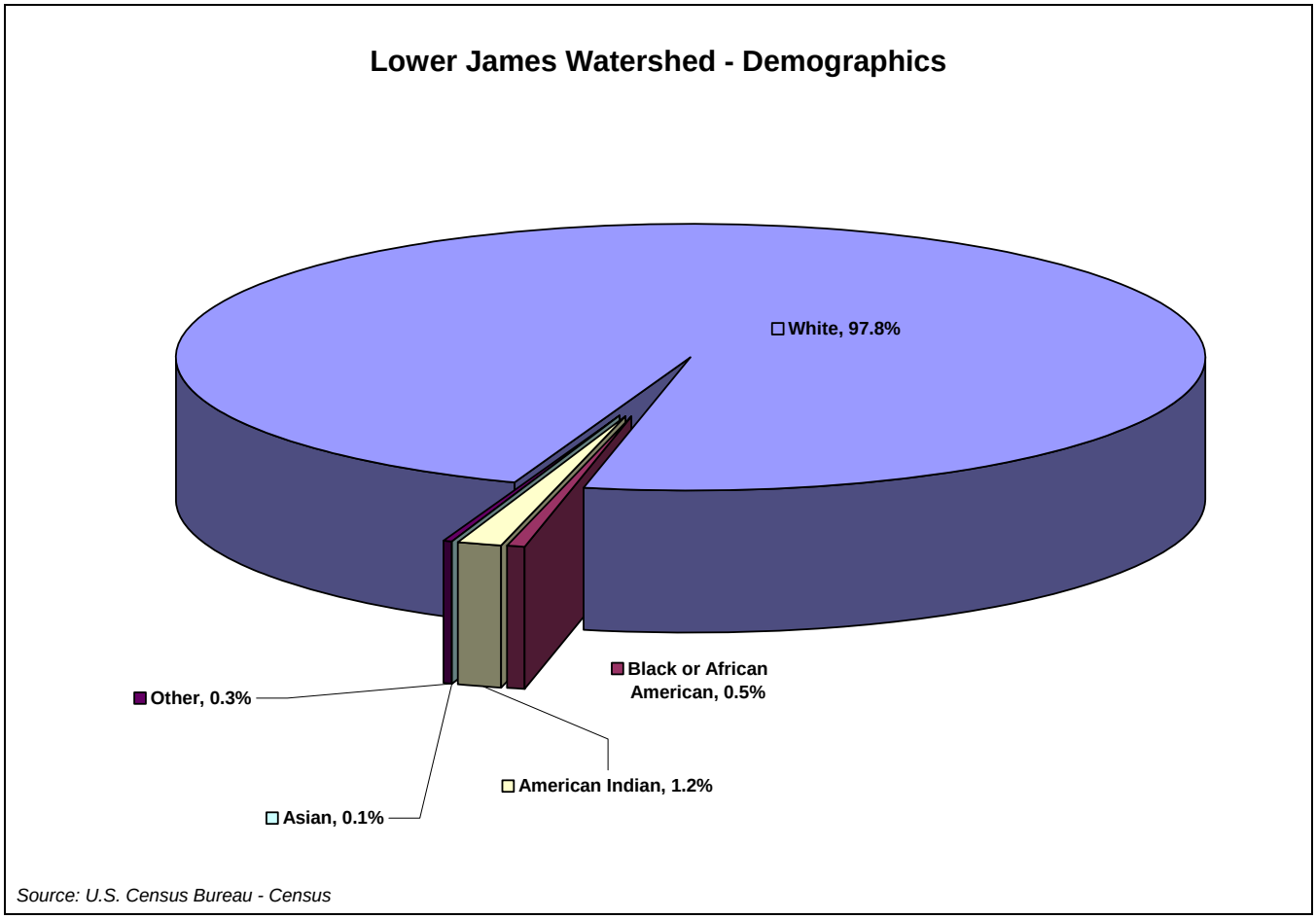
Source: U.S. Census Bureau - Census 2000

6.3 FARM SIZE



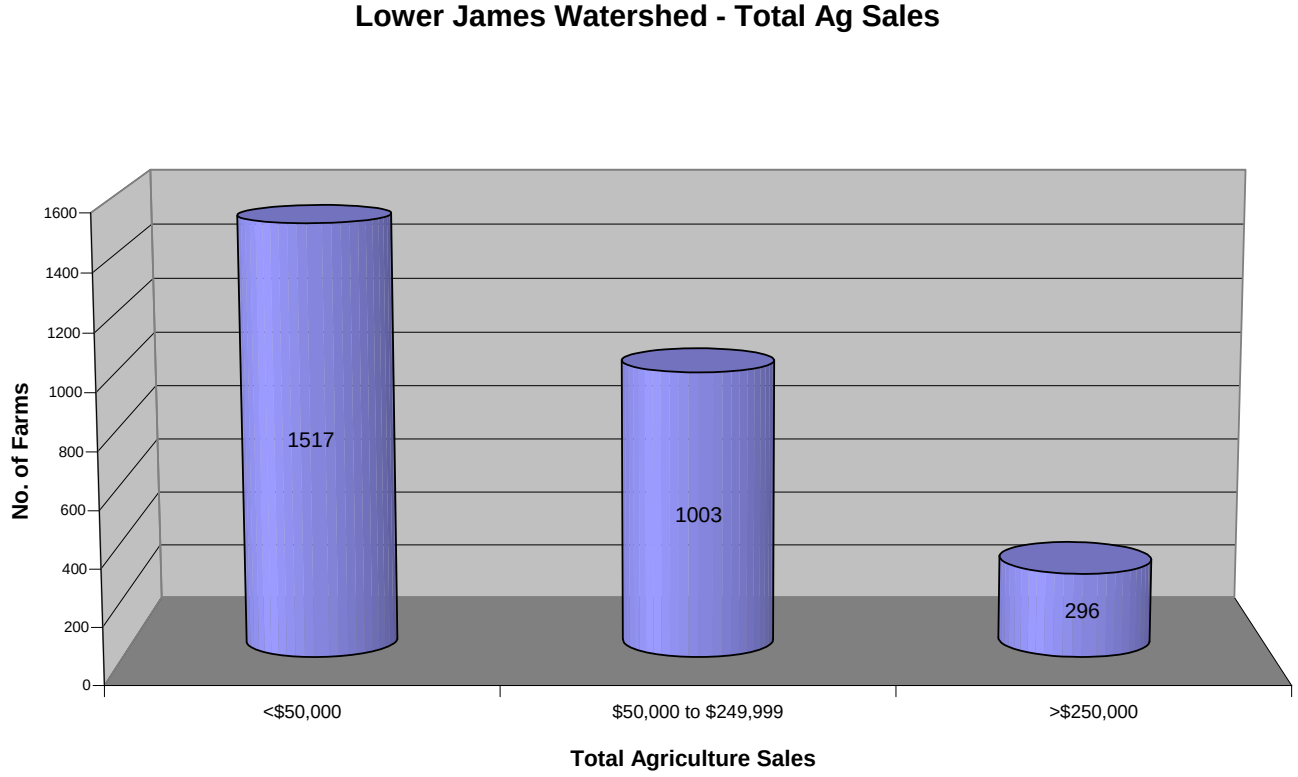
Source: 2002 Census of Agriculture

6.4 DEMOGRAPHICS



Source: U.S. Census Bureau - Census

6.5 TOTAL AGRICULTURAL SALES



Source: 2002 Census of Agriculture

7.0 REFERENCES/PREPARERS

7.1 LIST OF PREPARERS

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7.2 REFERENCES

[1] Natural Resources Conservation Service, 2002
[2] South Dakota Geological Survey, 2004
[3] Prism Group, 1990. South Dakota Annual Precipitation Data 1961-1990
[4] South Dakota State University, 2007. South Dakota Office of Climatology
[5] High Plains Regional Climate Center, 2007.
[6] United States Geological Survey (USGS) – Originator of National Land Cover Dataset (NLCD)
[7] South Dakota Department of Environment and Natural Resources (SD DENR)
[8] SD DENR – Surface Water Quality
[9] 2002 Agricultural Census. Adjusted by percent of HUC in the county or by percent of zip code in the HUC, depending on the level of data available.